BEACH USER OPINIONS AND THE DEVELOPMENT OF A BEACH QUALITY RATING SCALE

ROBERT MORGAN M.Sc.

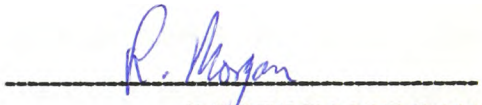
A thesis submitted as partial fulfilment of the requirements of the University of Glamorgan/Prifysgol Morgannwg for the degree of Doctor of Philosophy

This research was carried out with the collaboration of the Glamorgan Heritage Coast Project

December 1996

DECLARATION

This thesis has not been nor is being currently submitted for the award of any other degree or similar qualification.



ROBERT MORGAN

ACKNOWLEDGEMENTS

I would like to thank the School of Applied Sciences, University of Glamorgan for providing the funding for this research.

I am exceedingly grateful to Prof. Allan Williams and Ms. Teresa Berrow for their inspiration, guidance, encouragement and assistance throughout the course of this research. The assistance with questionnaire survey work obtained from the following persons and organisations is gratefully acknowledged: staff of the Glamorgan Heritage Coast Project; staff at the Ceredigion Heritage Coast; staff and visiting workers at the School of Applied Sciences, University of Glamorgan including Dr. Sarah Simmons, Prof. Allan Williams, Prof. Hongbin Liu and many others; staff at Universitat Politecnica de Catalunya, Barcelona; staff of Network MedCoast at the Middle East Technical University, Ankara, Turkey (especially Prof. Erdal Ozhan); and a great many others without whose assistance the surveys could not have been completed.

Also of great assistance were staff of the National Rivers Authority (now Environment Agency), St. Mellons, Cardiff; staff of Keep Wales Tidy, Penarth; staff at the offices of the Tidy Britain Group; various offices of local authorities in Wales; and the British Council, Ankara, Turkey. Mr. Terry Powell and Mr. Neil Jones assisted with figures, diagrams, etc.

I would finally like to thank my parents and Dr. Maura Conneely for the support and encouragement without which this work would not have reached a conclusion.

ABSTRACT

As a pilot study into questionnaire investigation of beach user opinions and perceptions, a survey was conducted of users of four beaches (Southerndown, Nash, Ogmore and Llantwit), at the Glamorgan Heritage Coast, Wales. Beach perceptions were assessed in terms of socio-demographics, psychological parameters (Eysenck Personality Questionnaire and Spielberger State-Trait Anxiety Inventory) and related to the existing beach environment. Few changes to general facility provision could be recommended, but a number of management recommendations were made. Beach user gender, socio-economic status, planned length of stay and anxiety/neuroticism level were shown by discriminant function analysis to influence beach selection.

A beach rating scheme was developed, based on a novel beach user questionnaire/checklist system. This questionnaire was used to interview users (n = 859) at 23 randomly selected Welsh beaches with regard to preferences/priorities for a wide range of beach aspects. Questionnaire data analysis generated scores which could be applied to checklists appropriate to other beaches of various commercialisation levels. Seventy Welsh beaches were assessed, producing scores from 39% (Porthcawl - Trecco Bay) to 69% (Broadhaven, S. Pembs. and Pembray). Landscape was assessed by panel judgements of a video panorama sequence, with scores for this aspect ranging from 19% (Prestatyn) to 80% (Broadhaven, S. Pembs.).

The rating scheme took into account a larger number of beach aspects (47) than any beach award/recommendation in common use in the UK. It successfully took account of differing beach user preferences/priorities for various beach aspects and also the differing beach user demands at commercialised as opposed to undeveloped beaches. Many differences in beach user preferences/priorities were observed according to differences in stated preferred beach type, many of which could be important for management. In addition, pilot scale studies were undertaken at the Costa Dorada, Spain and on the Turkish Aegean Coast. For the latter, beach rating was also carried out.

Future studies aiming to use stated perceptions, preferences and priorities of beach users to guide management should take account of possible influences such as beach user familiarity, expectation, cultural background and past experience. Much further work is required to develop beach user questionnaires to investigate aspects of beach user perception. Future rating exercises based on beach user preferences/priorities should take account of the need for beaches to meet minimum standards for the most important (as identified by beach users), beach aspects, in order to achieve a high rating or grade. The limitations of beach user surveys in terms of sampling difficulties need to be addressed. For valid management decision support, other stakeholders such as residents, tourist trade workers and those choosing not to visit beaches in particular areas need to be reached using other investigative methodologies.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

FOREWORD

The original basis for this study was the work of Williams *et al* (1993b). This included the use of a novel checklist featuring 50 beach factors, as a means of rating beaches. This checklist (Williams *et al*, 1993b), was envisioned as a possible basis for a beach rating system incorporating a greater range of beach aspects than existing well-known beach awards, such as the European Blue Flag and the Tidy Britain Group's Seaside Award in the UK. However, the factors in the checklist of Williams *et al* (1993b), and the scoring for the categories within each factor, were primarily based on the opinions of the authors. A pilot study was therefore conceived to investigate beach users themselves with regard to beach perceptions.

A pilot study into beach user perceptions was carried out at the Glamorgan Heritage Coast, Wales, UK. This set out to:

a) assess which aspects of beaches were of importance to users, firstly, by means of a small number of structured interviews and secondly, via a questionnaire survey;

b) assess the feasibility of, and problems associated with, a questionnaire survey of beach users;

c) investigate the possible value of questionnaire surveys to guide beach management, and;

d) examine the effect of selected socio-demographic and psychological parameters on beach user perceptions.

This pilot study showed the feasibility of beach user surveys featuring a lengthy questionnaire, with a high rate of user co-operation. Deficiencies with the beach questionnaire survey methodology in terms of obtaining a

representative sample of all beach users (e.g. those actually in the water could not be sampled), were identified. It suggested that many beach factors not featured in existing beach awards, were of appreciable importance to beach users. A number of tentative management suggestions were made on the basis of the pilot study results. It was also found that the data could be processed to investigate the effect of socio-demographic and psychological parameters on beach selection decision-making at the 4 beaches examined.

Taking account of the success and findings of the pilot study, the main study then set out to develop a beach rating scheme based on beach user preferences and priorities. It was considered that a beach-based questionnaire survey would have advantages over other methods such as postal surveys, in terms of considerably higher rate of questionnaire return and better quality of questionnaire completion, which would more than compensate for the difficulty in obtaining a representative sample of Welsh beach users. Beach users at a randomised selection of Welsh beaches were surveyed using the questionnaire, resulting in 859 questionnaires suitable for beach rating use. Questionnaire preference/priority responses were linked to items on a checklist, and 49 factors were scored at each of 70 Welsh beaches, generating a percentage score for each beach. Data allowed comparison of preference/priority information with stated preferred beach type and other beach user parameters.

If such a beach rating scheme were to be able to supplement or replace the European Blue Flag, it would need to operate across a similar range of Euro-Mediterranean countries. With this concept in mind, pilot studies were carried out in two Mediterranean countries to:

a) confirm the feasibility of using similar methodology in such countries;

b) confirm that the questionnaire could be translated into other languages and remain functional;

c) compare on a pilot scale, perceptions of beach users in different countries and from different countries of origin.

Findings of these Mediterranean studies were satisfactory in all of these regards and suggested the need for much further work, to investigate the influences of immediate environment and previous experience on beach user perceptions. The study as a whole suggested the need for further research to develop beach user perception questionnaires. Rating schemes based on beach user preferences and priorities appear to have considerable potential, but need to incorporate minimum standards for the most important beach aspects. In terms of beach management guidance, potential is again great but beach user sampling difficulties need to be addressed and other stakeholders must to be reached via other investigative methodologies.

CHAPTER 1

INTRODUCTION

1.1 Aims of the Study

The aims of this study were to:

i) Assess beach user opinions and perceptions in a pilot study at the Glamorgan Heritage Coast (GHC).

ii) Study connections between beach user perceptions and selected socio-demographic and psychological variables.

iii) Assess the usefulness of beach users opinions to coastal management with regard to the GHC and make suggestions for modifications to management based on these.

iv) Develop a questionnaire with which to examine the preferences and priorities of a representative sample of beach users in Wales.

v) Ascribe percentage rating scores to 70 popular tourist beaches in Wales, based on the preferences and priorities of Welsh beach users and taking into account all aspects of importance to these users.

vi) Conduct pilot beach user perception studies at selected Mediterranean coastal locations.

1.2 Coastal Zone Management

1.2.1 Defining the Coastal Zone

Coastal management refers to any government program established for the purpose of utilising or conserving a coastal resource or environment (Sorensen & McCreary, 1990). The term implies that the governmental unit administering such a program has distinguished a coastal area apart from the ocean and terrestrial domains. The interpretation of the term "coastal" varies widely. To some this land/sea interface has connotations of fish and wildlife, while to others it suggests beaches and dunes (Sorensen & McCreary, 1990). There is considerable discussion about the definition of the ocean and inland boundaries of the coastal zone and a wide range of such definitions have been proposed. At one extreme, the coastal zone could extend from the oceanward edge of the exclusive economic zone to the inland limit of climatic influence. Such a zone could be up to 400 km (250 miles) in width (Sorensen & McCreary, 1990). In contrast Costa Rica's coastal program extends from the mean low tide line to 200 metres inland (Sorensen, 1990). With regard to the outer limit of the coastal zone, Smith (1991), has commented on the lack of integration between coastal and sea management in the UK.

In terms of function, the coastal zone can be regarded as a congregation of complex systems which affect and interact with each other; such systems can be physical, biological or social/human. Traditionally, coastal areas have been attractive grounds for human settlements, commercial and industrial activities. Such uses have increasingly been seen as being in conflict with the nature conservation value of coastal areas (Ozhan, 1991). Water dependent activities such as fisheries, mariculture and shipping, together with the more recent coastal tourism industry have added to demand for, and put pressure on, coastal resources. Three major aspects of coastal activities crucial in terms of management considerations have been identified by Sorensen (*pers. comm.*).

These are tourism, fisheries and hazards, the latter mainly focusing on erosion and flooding.

1.2.2 Coastal Resources

Coastal resources have been divided into 3 groups in terms of sustainability (Ozhan, 1991):

1) Renewable resources such as living resources (mammals, commercial fish stocks, use as a heat sink), which allow sustainable use.

2) Partly (or slowly) renewable resources such as deposits of sand and gravel, aesthetic quality, and to some extent water quality.

3) Non-renewable resources such as oil and gas reserves, minerals, archeological/historical remains, natural sites and space for development.

In practice, almost all coastal resources are subject to an adverse impact from at least one other use or activity. Those adversely affected by the majority of uses and activities are water quality, aesthetic quality and natural sites /habitats/ecosystems. Together with urban and industrial developments, coastal tourism appears to have the greatest potential for adverse affect on a large number of resources.

1.2.3 Development of Coastal Zone Management

Impetus to initiate the development of coastal zone management (CZM) as a discipline can be traced back to the report of the US Commission on Marine Science, Engineering and Resources (Stratton Commission), "Our Nation and the Sea", published in 1969 (Sorensen & McCreary, 1990). The findings and recommendations of this report prompted the drafting of the legislation that ultimately evolved into the US Coastal Zone Management Act of 1972 (CZMA;

Zile, 1974). This was intended to address comprehensively the problems of the coastal zone (Archer, 1988). Efforts in the USA following this Act stimulated discussion worldwide, but successful CZM is still a distinguishing character rather than a commonality between countries (Ozhan, 1991). Ballinger *et al.*, (1994), emphasised the need for coastal management to be conceived within long-term, regional frameworks. Since the early 1970's coastal zone management legislation has been passed or considered by most developed maritime nations but there have been great variations in the remit and administration of these CZM programmes (Gubbay, 1991). More recently, integrated coastal zone management (ICZM) has been defined as "a dynamic process in which a co-ordinated strategy is developed and implemented for the allocation of environmental, socio-cultural and institutional resources to achieve the conservation and sustainable multiple use of the coastal zone" (CAMPNET, 1989). Participants at this workshop (CAMPNET, 1989), agreed that a valid ICZM program would have all the following five attributes:

- The process would continue over considerable time and require considerable updating and amendments. ICZM is not a one time project.

- There is a governance arrangement to establish the policies for making allocation decisions and an arrangement for actually making the decisions.

- The governance arrangement uses one or more management strategies to rationalise and systematise the allocation decisions.

- Management strategies recognise the interconnections between coastal systems. This requires a multisectoral approach to be used in the design and implementation of the management strategy.

- It has a geographic boundary from the ocean environment across the transitional shore environments to some inland limit. Small islands may not have an inland limit.

The primary goals of ICZM are to resolve conflicts among different users and to limit impact on coastal resources from various uses to levels which do not endanger sustainability (OECD, 1990). OECD (1990) have also suggested that criteria for sustainable development in the coastal zone should have four dimensions:

1) Ensuring the presence of critical stocks of renewable resources.

2) Defining and maintaining acceptable quality levels of resources.

3) Preserving unique species and ecosystems, together with cultural and historical landmarks for future generations.

4) Maintaining the quality of life in the coastal zone by limiting population densities and by providing only those infrastructural facilities which are necessary.

It has been argued that it is impossible to meet the above criteria whenever the decision making is governed by short term economic evaluations (Ozhan, 1991). Environmental stability and integrity, equity (for future generations), and social considerations must also be taken into account for achieving sustainability criteria in the coastal zone.

1.2.4 Integration in Coastal Zone Management

CZM has to a large extent featured vertical integration through layers of government, through national and/or local government to individual agencies who deal with aspects or geographical regions of the coast, and finally to those who live on/use the coastal zone. One of the key prerequisites for sustainable development of the coastal zone is a high level of collaboration among various

agencies and authorities. In this regard, an increasing need is seen for horizontal integration, e.g. between tourism, fisheries, industry and transport.

In practice, the basis for actual management control of the coast is often complex, with responsibility often overlapping between several levels of government and a large number of sectoral management authorities (Kenchington, 1992). For example, Sorensen & McCreary (1990), described a typical coastal area of the US where at least 22 agencies have responsibility for policy affecting coastal management. In the UK, there is at present confusion about whether comprehensive coastal zone management is in operation since initiatives are operating to varying extents at local, regional and national levels (Gubbay, 1991). In the UK, there are currently over 250 organisations involved with coastal zone decision making (Williams *et al.*, 1993a). According to the Countryside Commission (1991), the UK lacks a national policy framework for the coast as a whole. The "lagging behind" of the UK with regard to coastal management contrasts with the development of the related field of sea use management, where the UK was one of the most important initiators (Smith & Lalwani, 1991).

According to Fabbri (1996), development of basic scientific knowledge with regard to the coast is progressing at a slow pace. Empirical methodology is often used in addressing coastal problems when recourse to more basic conceptual thinking might prove more beneficial (Fabbri, 1996). Orbach (1996), identified sub-cultures in different agencies (e.g. scientists, policy makers, private agencies), with input to coastal decision making. These different sub-cultures were the result of differing education, training, institutional ethos, time scales of thinking/action and means of communicating. Orbach (1996) argued that these differences could cause a lack of mutual respect, deficiencies in communication and misuse of each others products. Hence, even when scientific progress is made, the information is often misused and sometimes "it hardly flows into society and decision makers" (Fabbri, 1996). In consequence, users often see little benefit from scientific advances. Another problem is disengagement from the decision process (Orbach, 1996). This can particularly affect the end user (general public/beach user), who

can withdraw from policy input because of lack of suitable tools with which to communicate. These arguments illustrate the need for the construction of systems where end users, scientists and policy makers all have a legitimate place and can communicate effectively. Such involvement is essential in achieving consensus in deciding on policy options (Orbach, 1996).

1.3 Coastal Tourism

Until recently tourism issues in ocean and shoreline settings have generally received far less attention than aspects such as development, shipping, fishing and coastal engineering (Miller, 1993). However, recreation and tourism are now being seen as increasingly important aspects of coastal management (Kenchington, 1992). Correspondingly, coastal environments are being seen as increasingly important in the provision of open space and opportunities for leisure, relaxation and physical activity to bring relief from an increasingly urbanised and pressured world. In many parts of the world (e.g. the Mediterranean, see Chapter 6.2), tourism pressure and subsequent development has led to urbanisation of long coastal stretches. In many cases this has led to a decline in local cultural heritage, destruction of natural resources, exclusion of local residents, changes in social values, combined with failure to reach desired economic objectives (Smith, 1991).

In the UK, the situation is rather different. UK coastal tourism dates back to the late 19th century, with rapid development of many large coastal resorts. Increasing affluence and affordability of cheap package holidays to overseas (mainly at first, Mediterranean), coastal destinations from the 1960's onwards led to a decline in bookings for long stay holidays at UK resorts. Between 1976 and 1987, the number of main holidays in the UK continued to decline slowly, although there was an increase in shorter holidays. In the same period however, foreign travel more than doubled (Lickorish, 1988).

Some attention has also been paid to the changing socio-economic composition and expectations of UK leisure facility users. Martin & Mason (1993), considered that future UK leisure facility users would be older than in the past, more affluent, more demanding in terms of quality, more discriminating and seeking destinations and pursuits that offered a chance to participate and learn. Other dimensions thought by Martin & Mason (1993) to be of increasing future importance were the natural environment, where destinations offer scope for visitors to have close contact with natural surroundings and flexibility, as visitors look for ways to escape congestion at popular destinations by visiting smaller scale attractions. Owen (1990), considered that British seaside resorts should anticipate such rising expectations, but lamented the existing low standards of many. Particular emphasis was placed on perceived low standards of refreshment facilities, seafront traffic noise/congestion, litter and general untidiness. Increasing leisure user focus on quality and specialism has also been anticipated by Lickorish (1988).

1.4 Opinion/Perception Research in Leisure and Tourism Management

Anastassova (1996) enumerated 10 key factors for the successful development of beach tourism in an area. Among these were market research in terms of knowledge of the needs and preferences of the tourists, and the use of beach awards as tools of sales promotion. In the UK context, beach awards are handicapped by proliferation of awards/awarding bodies, low public awareness and distrust of their validity (House & Herring, 1995). UK beach award systems are discussed in more detail in Chapter 2.5.

As mentioned in Chapter 1.2.4, there is a need for the development and utilisation of systems to engage the public in the policy and decision making processes. However, up to the present time, opinions and preferences of beach users have rarely been taken into consideration in the evolution of coastal zone management policies. Few researchers have tried to gauge the opinions of beach users and assess their desires and priorities (Cutter *et al.*, 1979; Morgan *et al.*,

1993). Cutter *et al.*, (1979) found that the most important ideal characteristics at all sites investigated in New Jersey, USA were cleanliness of the beach and water. These were followed as a third priority by the quality of the natural attributes of the beach. Compared to beaches, a substantial volume of user perception research in other spheres of recreation has been carried out. User perception research has been used to guide management of forests for recreation purposes in Denmark (e.g. Koch & Jensen, 1988), and the Netherlands (Boerwinkel, 1992). Perceptions of decision makers have also been examined with regard to forest recreation and landscape preference in Denmark (Jensen, 1993).

Similarly, few attempts have been made to examine the beach users' decision making process in beach selection (e.g. Cutter *et al.*, 1979; Hodgeson, 1983). Cutter *et al.*, (1979), found that many beach users in New Jersey, USA were selecting a less than optimal beach environment with regard to their stated priorities, with factors such as accessibility, social interaction and available facilities playing a major role in selection. The conclusion was that most people were willing to trade-off the quality of the beach (in terms of their own priorities), for convenience. Hodgeson (1983), investigated the decision making process with regard to holiday destination selection as a whole. Influences and factors were found to be, in descending order of importance:

i) Expectations/ambitions
ii) Past experience
iii) Recommendations and advice of friends
iv) Professional recommendations/advice (e.g. travel agents, writers, TV programmes)
v) World events (e.g. exchange rates, politics)
vi) Holiday brochures
vii) Promotional activity

It is of interest that aspects directly influenced by the tourist industry and tourism managers (professional recommendation, brochures, promotion), did not figure amongst the three most important factors.

CHAPTER 2

PREVIOUS WORK - A LITERATURE REVIEW

2.1 Introduction

Perception studies of how man viewed the environment were initially dominated by geographers (e.g., Burton & Kates, 1964; Saarinen, 1966). Later, geographers commenced working with psychologists to examine the role of personality in decision making, while more recently geographers have begun using psychological techniques (e.g. Williams *et al.*, 1993a). Burton (1971) argued that the social role of attitude and perception studies should be to provide input to the planning process. This emerging area has been characterised by interdisciplinary studies and been given labels such as environmental psychology, environmental perception, behavioural geography and ecological psychology (Saarinen, 1976). Saarinen (1976), described the field as lacking an agreed name, body of theory or well developed methodology.

2.2 Water Quality

Public perception of river water quality is fairly well documented (House & Sangster, 1991), but few workers to date have examined beach user's water quality perceptions. David (1971), examined the perception of water pollution among members of the public (n = 574), in Wisconsin, USA. It was found that women were more likely than men to regard pollution as a problem. When asked to describe pollution in lakes and rivers, most people mentioned algae or murky, dark water, and only 6% mentioned chemicals or "disease germs". However, the separation in context, time and space of David's work from this study is considerable.

Nicholson and Mace (1975), looked at user perception of water quality in three Minnesota State Parks, USA, and compared this with some measured and

observed water quality parameters. It was found that most respondents perceived water pollution purely on a visual basis, and it was considered that the type and degree of pollution identified by the recreationist could be important through its influence on user evaluations and preferences. Dinius (1981), examined water quality perceptions by using a visual test consisting of photographic slides of water sites, where the level of visual pollution was artificially altered by the investigator. Increases in water discolouration and quantity of litter were viewed as increases in the level of pollution. Interestingly, laymen not only evaluated visually polluted sites lower for recreational activities such as picnicking, but also evaluated the actual water quality as lower. Smith *et al.,* (1991), working in New Zealand also found that water quality assessment, this time in relation to lake bathing, was strongly related to visual cues, particularly water clarity.

Lant & Mullens (1991), rather than merely looking at the concept of water quality, offered a broader concept of "lake/river quality", which was a collection of ecological, aesthetic and physical characteristics together creating an opportunity for recreation and scenic enjoyment. They considered that this better described the characteristics that recreationists valued in lakes and rivers, and should be the basis for defining environmental improvements and declines at these sites.

2.3 Research on Landscape/Scenery Aesthetics

Concern about conserving coastal landscape quality in Britain can be traced back to the 1940's and the work of Prof. J.A. Steers of Cambridge University (Steers, 1948). Steers toured the British coastline and subjectively selected areas of natural beauty which led directly to the setting up of Heritage Coasts. During the last three decades, public awareness of coastal landscape quality has given rise to an increasing demand for planning techniques which can evaluate coastal scenery, with the aim of conserving its quality (Williams & Lavalle, 1990). It has been argued that landscape evaluation should play a role in formulation of policies designed to protect the landscape (Laurie, 1975). Carls (1979) considered that sound ecological management of the coastal zone is also

good management for sustained recreational use and the preservation of aesthetic quality. Williams and Lavalle (1990) identified uses of landscape evaluation in the areas of landscape preservation (identifying the value to society of particular areas/views), landscape protection (identifying high quality landscapes and controlling development), landscape improvements (to identify components that may detract from views) and to guide recreational policy by the identification of areas of high landscape quality.

A huge literature exists concerning the philosophical and sociological aspects of landscape, but only a limited amount of information has been published with regard to assessment of coastal landscape scenery. It has been considered that landscape beauty derives from components such as vegetation, landforms, presence of built structures and other overt signs of human activity, but cannot be equated to the sum of these individual components (Appleton, 1975a and b).

The value of landscape has been attributed to its potential in terms of three aspects (Dearden, 1980):

i) Recreation. The appearance and perception of the landscape has been considered to be the most common aspect of public enjoyment of the outdoor environment (Williams & Lavalle, 1990).

ii) Spiritual Refuge. Man has a spiritual and emotional need for beautiful surroundings (Zube, 1987).

iii) Historical Resource. In a changing world a need exists to preserve historical aspects of the landscape that formed an important part of the environment for our ancestors (Williams & Lavalle, 1990).

With regard to national and cultural differences in landscape preference and appreciation, various workers have reached a range of conclusions. Generally however, literature on this subject is sparse (Shafer & Tooby, 1973;

Zube & Pitt, 1981, Buhyoff *et al.*, 1983), especially with regard to coastal landscapes and illustrates a lack of consensus. Eleftheriadis *et al.*, (1990) found agreement between European nationality groups with regard to the most and least preferred coastal landscapes, but also many significant differences; this was attributed to cultural differences and to familiarity with the scenes of their home environments. Fines (1968), Kaplan *et al.*, (1972) and Zube (1973) have found natural landscapes to be perceived as more distinguished and spectacular, more preferred and more scenic, respectively, among culturally homogeneous participants. A number of workers have demonstrated a similarity in landscape preference between groups of different nationalities but broadly similar cultures (e.g., Shafer & Tooby, 1973; Ulrich, 1977; Zube, 1984). Zube & Pitt (1981) however, found that not all cultures share the perception that landscapes containing man-made structures are necessarily less scenic than natural landscapes and suggested that we may be explicitly taught, or implicitly led to believe that scenic beauty is primarily an attribute of unmodified landscapes. Buhyoff *et al.*, (1983) found evidence for moderate differences between national landscape preferences within Europe.

Several studies (e.g., Zube & Pitt, 1981), have suggested that environmental experience and landscape familiarity can be important factors in shaping perceptions of valued landscapes. An analysis by Wellman and Buhyoff (1980) on the other hand, indicated no regional familiarity effect. Landscape aesthetic research has also inferred that visual preferences are influenced by many variables including first impressions, ideal type of landscape, stereotypes, gender (Nias, 1977; Iso-Ahola, 1982), age and occupation (Anantharaman, 1980).

Landscape evaluation techniques may be divided into two groups:

i) Component based methods. Such methods attempt to be objective by giving precise numerical values to components of the landscape such as area of vegetation, relative relief, number of buildings, width of beach, etc. Appleton (1980) has argued that it is incorrect to add together figures which

measure different parameters when no mathematical relationship has been established between them; "we do not add Francs to Deutchmarks and expect the aggregate to mean anything" (Appleton, 1980, p. 3). Component based methods have also been criticised by Kaplan (1975), Penning-Rowsell (1982) and Bourassa (1991). Moreover, it has been argued that with regard to perception and preference, objective measurement is in any case misplaced (Williams & Lavalle, 1990).

ii) Integrated techniques, based on field visits, motion photography or still photographs. Field based methods suffer specifically from problems relating to logistics which can make comparison of large numbers of locations impracticable.

After some consideration, it was felt that the landscape and aesthetic quality of beach areas could not be adequately assessed using component based methods, in terms of the presence/absence of various "detractors" (e.g. factories, sea walls), relative relief, visibility of vegetation, etc., which could be included in a practicable checklist. Aspects of the beach which were of importance purely from a viewpoint of landscape aesthetics and which could not be quantitatively assessed in a valid fashion, were therefore excluded from the on-site checklist assessment of the beach.

Photographic representations of scenery were highlighted by Robinson *et al.,* (1976) as a means of increasing the numbers of observers whose opinion could be obtained. Prior to this, Shafer *et al.,* (1969) used factor analysis and multiple regression analysis to account for variation in preference scores for landscape photographs. Peterson & Neumann (1969) used photographs of beaches to study beach user preferences in Chicago and found that scenic natural beaches were preferred by older and more educated people. Evidence reviewed by Shuttleworth (1980), Nassauer (1982), Zube *et al.,* (1987) and Bosselmann & Craik (1989) has shown that judgements from photographs are highly correlated with on-site judgements of the same areas. Group to group reliability within

populations and test-retest reliability have also been found to be generally high (e.g., Jackson & Hudman, 1978; Hull & Stewart, 1992). Clamp (1976) identified three main types of technique for assessing landscape via photographic media:

i) The direct unstructured method where raters assess views using their own personal criteria for good or bad landscape.

ii) The direct structured method where raters are given a list of features to look for. The landscape rating is then derived from the presence or absence of these features according to a formula devised by a landscape "expert".

ii) The calibrated method. Raters assess views using their own criteria. Features or characteristics of the views are measured and weighted from the raters' assessments.

In the second of these methods, the values attached to landscape depend upon the judgement of one individual "expert". This has been considered unsatisfactory for two reasons. Firstly, one individual cannot be guaranteed to be representative of the population as a whole or even a sub-group of it. Secondly, the method depends on the individuals' ability to devise a mathematical formula representing his own landscape preferences (Clamp, 1976). For the purposes of this study and bearing in mind the above considerations regarding the questionable validity of deeming a landscape to be directly related to the sum of its visible components, it was felt that the first of the above techniques was preferable to the third.

Clamp (1976) compared evaluations of 17 English landscapes obtained from sets of six colour transparencies, each set of which showed a complete panorama from a single viewpoint, with a cine film panorama during which the camera was rotated through 360° at a uniform speed and with field visits. The results indicated that both photographic techniques were equally satisfactory. Banerjee (1977), examined the extent to which public perceptions of coastal

developments varied according to age, gender and income along the Los Angeles County coastline, by measuring audience reaction. Panoramic film recordings with soundtracks were played to a theatre audience. Banerjee (1977) found that negative reactions peaked where land use intensity and man-made noise were highest, and positive reaction where natural landscape elements predominated. In contrast to Peterson & Neumann (1969), Banerjee (1977) found that those under 25 years of age were most critical of man-made adaptations in the coastal landscape. Gender and income differences were found to make little difference to aesthetic perceptions.

2.4 Beach Selection

Very little work can be referenced regarding attempts to relate preference for various beach aspects and beach selection, to a range of personality and socio-demographic parameters (e.g. Cutter *et al.*, 1979; Chapter 1.3). More work has been done with regard to the influence of psychological and socio-demographic factors on general leisure activity choice. Many researchers (e.g. Howard, 1976; Sen, 1976; Nias, 1977; Kabanoff, 1981), have indicated that personality parameters such as extroversion, anxiety and neuroticism have an effect on choice of leisure activities. In addition, previous research has also highlighted the relationship between choice of leisure activity or environment and several other factors such as age, length of time an individual intends to pursue the activity (Eastwood & Carter, 1984), and various other socio-demographic factors.

Kelly (1975) and Anantharaman (1980), found that occupation and socio-economic status played a significant role in leisure activity selection. Nias (1977), and Iso-Ahola (1982), found that gender can affect choice of leisure activity. Extroverts are less likely to choose solitary activities (Eysenck & Eysenck, 1975; Van Duerzen & Van Oers, 1984), and so might be expected to frequent busier, more commercialised beaches. Wolpe (1980), was of the opinion that anxious people would be expected to seek out quiet environments, so such people

might be expected to prefer quiet, lightly developed beaches. Eastwood & Carter (1984), and Williams *et al.,* (1993a) at the GHC, found socio-economic and personality differences between those choosing commercialised and uncommercialised beach environments.

2.5 Overall Beach Evaluation

2.5.1 Introduction

A dearth of work exists with respect to rating beaches in an objective and quantitative manner. Although many beach award/evaluation systems endeavour to guide beach users with regard to beach quality, those currently (1996) in use are based on a small number of measurable parameters and do not approach coverage of all possible aspects of the topic (Williams & Morgan, 1995). The limited amount of work so far carried out to investigate the level of public knowledge of existing commonly used UK beach awards/evaluation systems, has produced results which may be regarded as giving cause for concern. House & Herring (1995), found that only 41% of beach users knew that the European Blue Flag (see Chapter 2.5.2), indicated that the beach met EC water quality guidelines. The corresponding figure for the Seaside Award (see Chapter 2.5.3), was 27%. As part of research into public perception of beach litter at Whitmore Bay, Barry, South Wales, Nelson (*pers. comm.*), found that only 27% of beach users recognised the Blue Flag itself and 23% recognised the Seaside Award flag. Seven percent thought that the Blue Flag symbol indicated danger. Nelson (*pers. comm.*), found that 63% had heard of the "Good Beach Guide" (see Chapter 2.5.4), 67% had heard of the European Blue Flag Award and 47% had heard of the Seaside Award. Further work is called for into the level of detailed public knowledge of beach award/evaluation systems, knowledge of award/recommendation status at particular beaches and influence of award/recommendation status on beach selection decision making.

2.5.2 European Blue Flag

Probably the most widely known and prestigious beach award within the European Community (EC) is the European Blue Flag Award. The European Blue Flag Scheme is organised by the Federation of Environmental Education in Europe (FEEE). Qualification is based on 26 criteria covering water quality (7 criteria), environmental education and information provision (6) and beach area management (13). Of these 26 criteria, 19 are specified which must be fulfilled for a beach to receive the award. Compliance with the remaining 7 criteria is a recommendation only. The award requires compliance with the current "G" (Guideline) standards of the EC Bathing Waters Directive (76/160/EEC) for the microbiological parameters of total and faecal Coliforms and faecal Streptococci, but not with the standards for Salmonella or Enteroviruses (Williams and Morgan, 1995).

In the UK, at least 20 samples (with not more than two weeks between samples), must be taken for total and faecal Coliform analysis throughout the EC-defined bathing season (15 May to 30 September). Two samples must also be taken to be analysed for faecal Streptococci. The Directive (76/160/EEC) requires the samples in each participating country to be taken and analysed by a 'competent authority' appointed by its government; in the UK this was the National Rivers Authority (NRA), now the Environmental Agency (EA) in England and Wales. Required compliance levels for the analytes in terms of the "G" values and also the less strict "I" (Mandatory) values are shown in Table 2.1.

Parameter	G	I	Compliance
Total Coliforms	< 500	< 10,000	80%
Faecal Coliforms	< 100	< 2,000	80%
Faecal Streptococci	< 100	-	90%

Table 2.1 UK Microbiological Compliance Levels for EC Directive 76/160/EEC (per 100 ml)

Other parameters relevant to the Blue Flag Award are the provision of water quality information on or close to the beach together with details of sampling points. The beach management authority must be able to demonstrate the existence of educational activities relating to the coast. There must be adequate refuse disposal facilities, daily beach cleaning where necessary, safe access, provision of clean sanitary facilities and first aid provision. If lifeguards are not present, lifesaving equipment must be provided (FEEE, 1994). Control must be exercised over activities such as driving, dumping and unauthorised camping, together with either a dog ban or strict dog control. The FEEE (1994) suggest that drinking water, telephones and facilities for the disabled should also be provided.

In 1994, 1454 beaches in the EC were awarded the Blue Flag along with 337 marinas (Williams & Morgan, 1995). This figure rose to 1558 in 17 participating countries by 1996. There have been marked disparities in numbers of Blue Flag beaches between countries in comparison with their length of shoreline and total number of beaches, e.g. in 1994; UK - 17 (31 in 1996, 7% of the total number of beaches); Germany - 47 (3, <1%); Denmark - 139 (171, 13%); Greece - 192 (311, 20%); Italy - 212 (219, 5%); Spain - 306 (329, 22%). Turkey joined the award scheme on a pilot basis in 1993 and had 15 Blue Flag beaches by 1996. In the UK, the number of Blue Flag beaches remained almost static from 1992 until 1995, with a significant rise to 31 beaches in 1996 (Table 2.2).

	1992	1993	1994	1995	1996
Seaside Award	92	133	165	182	203
Blue Flag	17	20	17	18	31

Table 2.2 Numbers of Blue Flag and Seaside Award Beaches in UK 1992 - 1996

2.5.3 Tidy Britain Group Seaside Award

The Seaside Award is a UK award scheme which encompasses both resort and the less developed 'rural' beaches. In terms of the award criteria, rural beaches are not expected to have the same level of supervision or facilities as resort beaches. It was introduced in 1992 and is administered by the Tidy Britain Group (TBG; in Wales, via its subsidiary organisation Keep Wales Tidy; KWT). The TBG is a partly government funded but independent agency, campaigning for environmental improvements in wide variety of fields of interest.

Requirements for the Seaside Award are principally based on high standards of facilities and management, beach cleanliness and water quality. There are 29 such criteria for resort beaches compared to 12 for rural beaches. At the time of the main study (1994/5), the award was split into two levels based on water quality; at least Mandatory ("I") water quality standards were required for the beach to be eligible for the Seaside Award while beaches reaching the Guideline ("G") standard could receive a Premier Seaside Award flag. For 1996, only one grade of Seaside Award flag was awarded, with a requirement for only "I" water quality standards.

Not surprisingly in view of the wider range of beaches eligible and the less stringent criteria, a much larger number of UK beaches have received the Seaside Award Flag compared to the European Blue Flag. In 1994, 65 beaches received the Premier Seaside Award and a further 100 received the Seaside Award flag (165 beaches in total). In 1995, 182 beaches received the award, rising to 203 in 1996 (see Table 2.2). Until 1996 judging was based on a single visit to the beach but now (1996), awards are based on up to 3 visits during the preceding season.

As with the European Blue Flag, the Seaside Award flag is usually flown in a prominent position in the beach area to advertise the beaches quality award to

visitors. The award is also promoted through tourist literature and by the Tidy Britain Group.

2.5.4 Good Beach Guide

The Good Beach Guide is a book available for purchase by the general public through retail outlets and published annually by the Marine Conservation Society (MCS), a UK environmental organisation working to safeguard the marine environment (MCS, 1995). "The prime criterion for a beach to be featured here, however, is water quality", (MCS, 1995; p.8). In 1996, the ninth year of assessment, nearly 900 beaches in the UK and Channel Isles were assessed (including 164 in Wales) and 94 were recommended (19 in Wales; MCS, 1996). The MCS divides bathing quality into 5 classes (zero to four "dolphins", Table 2.3).

f (fail)	less than 95% pass of EC Mandatory ("I") standards
one dolphin	95% pass of EC Mandatory standards
two dolphins	100% pass of EC Mandatory standards
three dolphins	100% pass of EC Mandatory standards and 80% pass of Guideline ('G') Coliform standards
four dolphins	100% pass of EC Mandatory standards, 80% pass of Guideline Coliform standards, 90% pass of Guideline Faecal Streptococcus standards

Table 2.3 Good Beach Guide (MCS, 1996), Bathing Water Quality Classification

The minimum standard that a beach must reach to be recommended is 3 dolphins. However, beaches can fail to be recommended despite reaching the 3 or 4 dolphin standard because of any of the following:

- Insufficient information
- Adjacent sewage outfall/storm water outlet
- Dangerous bathing conditions (e.g. currents, rocks)
- Difficult access

- Location in an environmentally sensitive area
- Advice of local tourist authority not to promote beach
- Adverse reports in newspapers
- Marine litter/sewage related debris

In 1996, 67 beaches (including 7 in Wales), achieving at least 3 "dolphins" were not recommended because of "lack of information". Also in 1996 'The *Good Beach Guide* "will ... only recommend those beaches where no sewage outfall has been identified, or where sewage is treated to at least secondary level prior to discharge" (MCS, 1996, p. 11). In 1996, 76 beaches (12 in Wales), were not recommended for this reason in spite of achieving 3 or more "dolphins" for water quality. In Wales, the total of beaches in these two excluded categories in 1996 equalled the total actually recommended (19), even though the microbiological water quality criteria were met.

2.5.5 Costa Rica

Chaverri (1989) devised a checklist-based rating system to identify beaches suitable for tourist development in Costa Rica under the authority of the Marine and Terrestrial Act (Ley Maritimo Terrestre). Up to 113 factors per beach, split into two groups (52 'positive' and 61 "negative" factors) were subjectively assessed and given a score between zero and four. The final rating score for the beach was obtained by subtracting the sum of the "negative" scores from the sum of the "positive" scores.

No attempt was made to attribute quantitative values to scores for any of the factors, so that the score given to a beach for any factor (and hence the total score) was based purely on the subjective judgement of the particular assessor. Also, no attempt was made to assess the importance attached by beach users to any of the factors in the checklist in terms of weighting, or indeed whether some of the factors were considered by beach users at all. The division of factors into "positive" and "negative" categories could also be considered to be of doubtful

validity. Some such factors appeared to be duplicated between "positive" and "negative" categories, e.g. "vegetation quality", "vegetation extent" (positive factors), and "thorny vegetation", "non-vegetated areas" (negative factors). Some factors such as "tourist image" would appear to be so subjective as to offer no scope for quantitative assessment.

2.5.6 Schemes Developed at the Universities of Glamorgan, UK and Maryland, USA

Williams *et al.*, (1993b) devised a checklist based on the views of international coastal experts, to assess 50 beach parameters. Beaches were scored for each parameter on a scale from one to five. Six hundred and fifty beaches in the USA, 182 in the south-west peninsula, UK and 28 in Turkey were evaluated using the checklist, to produce an overall percentage rating score. Among the highest scores obtained were for Sarigerme (Turkey) - 89%, Porthmeir (Cornwall, UK) - 86% and Kapula (Hawaii, USA) - 92%.

After further consideration, the authors saw the need to modify many aspects of the checklist (Williams & Morgan, 1995). For example, in the checklist it was assumed that wide beaches were preferable to narrow, but this assumption was not supported by fieldwork. For sand colour, beach users' order of preference was assumed but not investigated. Similarly, many aspects of the beach environment were classified as good or bad without having regard to the possibly varying preferences of beach users and differing uses of the beach environment. Quantitative values were attributed to categories (scores) for some beach parameters, but many were judged on a purely subjective basis. No weighting was attached to the 50 parameters relative to each other, so that each contributed 2% to the beaches total rating score. No account was taken of the possibly differing requirements and preferences of visitors to resort and undeveloped beaches. Finally, landscape was assessed by means of a component-based system (presence/visibility of sea walls, buildings, industry, etc.). Such methods of landscape evaluation have been criticised by numerous authors (see Chapter 2.4).

2.6 Conclusion

From this review it can be seen that only a limited amount of work has been previously done which is directly relevant to examination of the perceptions of beach users in an actual coastal environment. If coastal management is to be increased and improved, it will be important to know what scenic and other resources are of greatest value to the public and what changes are acceptable and desirable. However, it appears that few, if any studies have asked what the general public want from, and indeed even why they visit, beaches. Why do some people visit long, sandy, commercialised beaches, while others will only visit small, deserted, pocket beaches? One aim of this study was to answer such questions, find out what the public want beaches to look like, and what features and facilities they want on and around them. Also, it seems that no study of such scope in terms of assessing the opinions and perceptions of beach users of a wide range of aspects of the beach environment, has been previously performed.

CHAPTER 3

PHYSICAL BACKGROUND

3.1 Introduction

The Glamorgan Heritage Coast area, site of the pilot study of this programme of work, is described in detail in Chapter 3.3. Beaches featured in this pilot study are shown in Fig. 3.1. The locations of the 70 beaches featured in the main beach rating study are shown in Figs. 3.2a and 3.2b.

3.2 South-East Wales

The Severn Estuary has a tidal range which is second in the world only to the Bay of Fundy, Canada, (14.8 m at Avonmouth), although the range for the South-East Wales and Glamorgan Heritage Coast (GHC) beaches is generally less than this (e.g. about 6 m at Llantwit; Fig. 3.1). The Vale of Glamorgan has been recognised as a series of "coastal platforms"; planes of marine erosion corresponding with ancient coastlines which have been uplifted to a moderate degree forming a low plateau (Glamorgan County Council, 1973). Two main marine platforms can be recognised at approximately 60 m and 120 m OD (Howe & Thomas, 1968).

Between Penarth and St. Mary's Well Bay, the strata is horizontal and composed of alternating bands of red and green marls, black shales and blue and yellow limestones. The cliffs in this area also contain belts of alabaster or gypsum, which was once mined in this area (Howe & Thomas, 1963). At Barry, three rocky headlands composed of beds of massive grey limestone jut out to the south (Howe & Thomas, 1968). These low cliffs are capped in several places by New Red Sandstone (Trueman, 1949). Cliff Wood, adjacent to Cold Knap beach (Barry) was designated as a LNR in 1970.

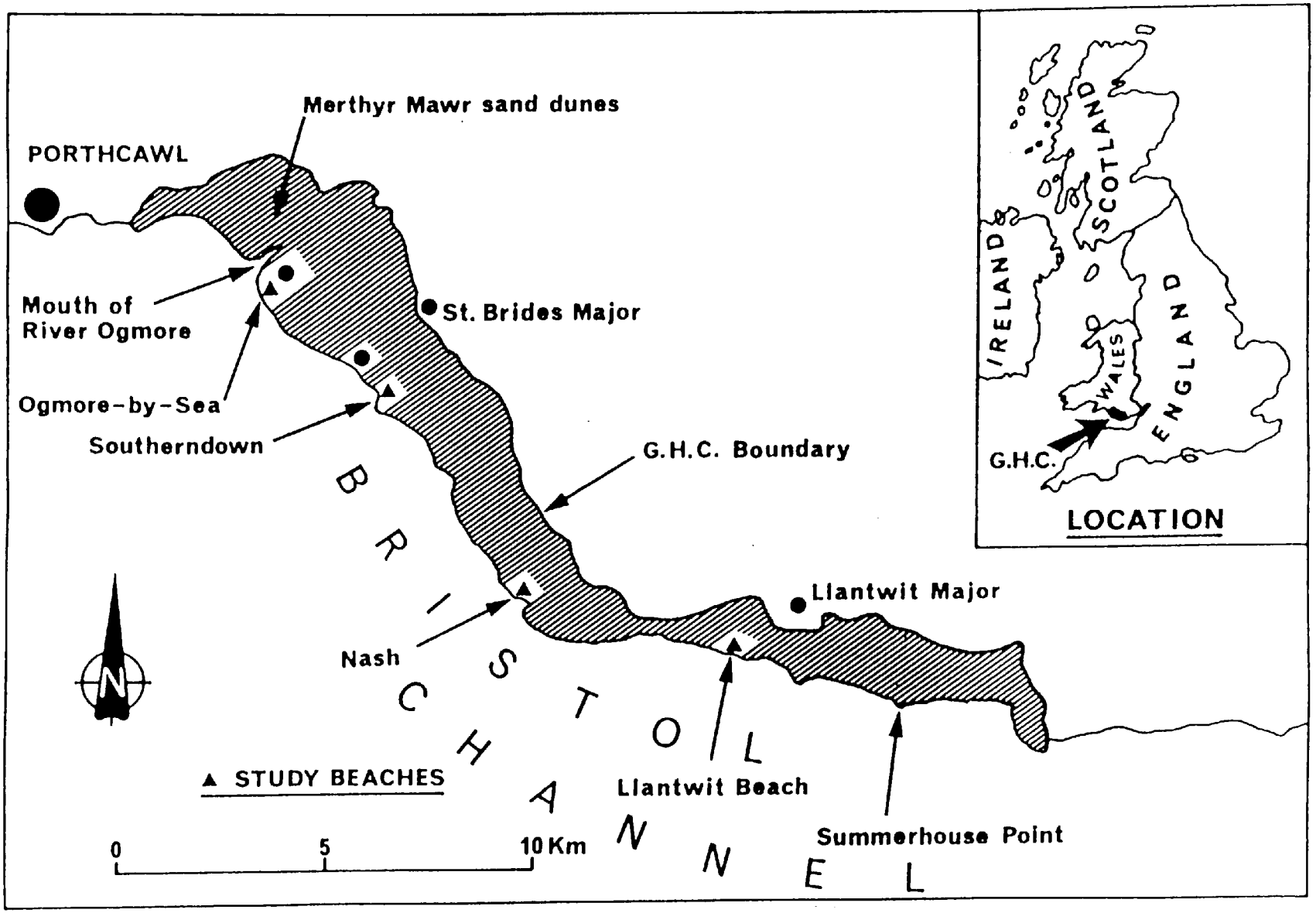


Fig. 3.1 Glamorgan Heritage Coast - Pilot Study Beaches

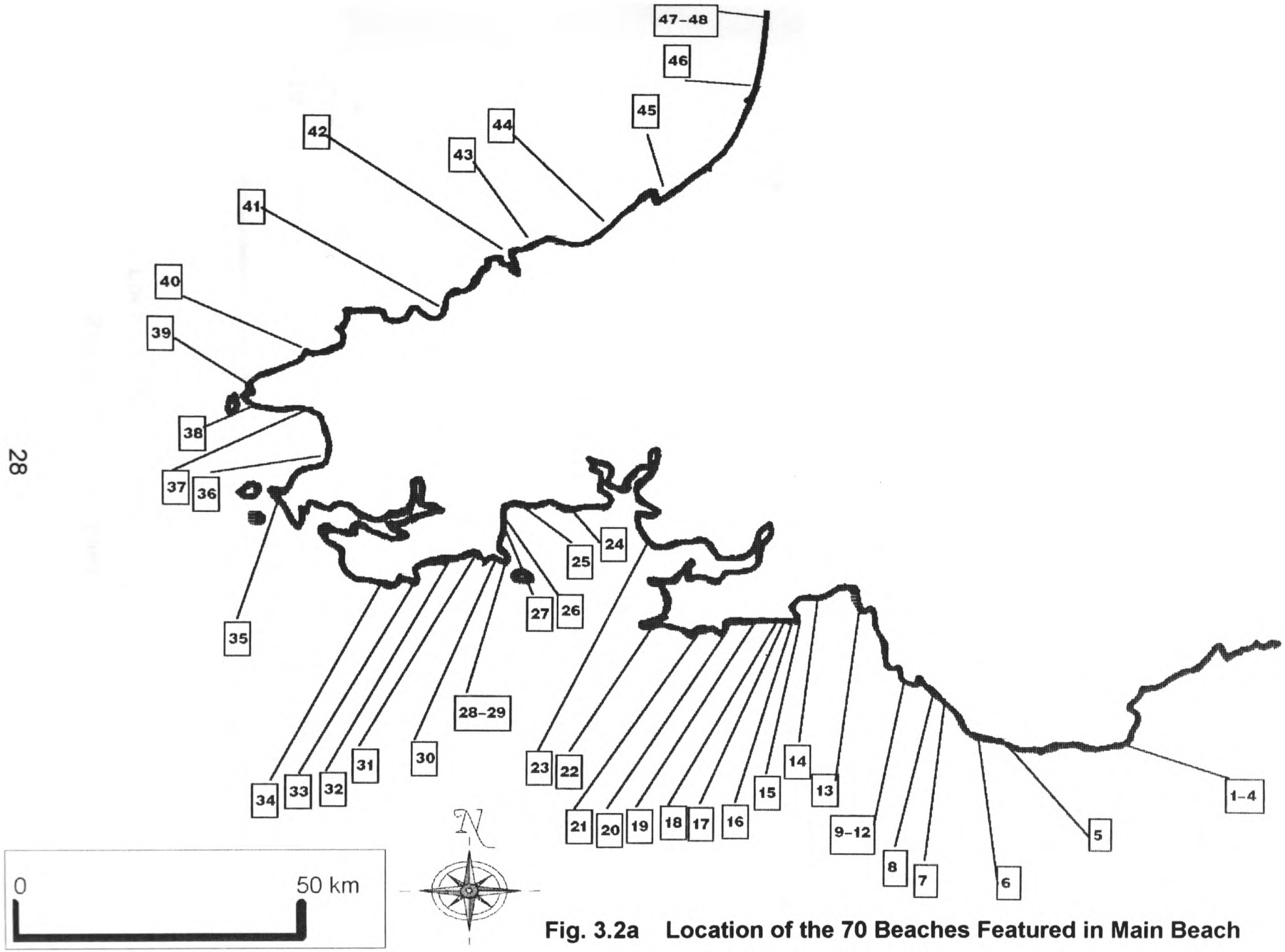


Fig. 3.2a Location of the 70 Beaches Featured in Main Beach Rating Study - Southern Section

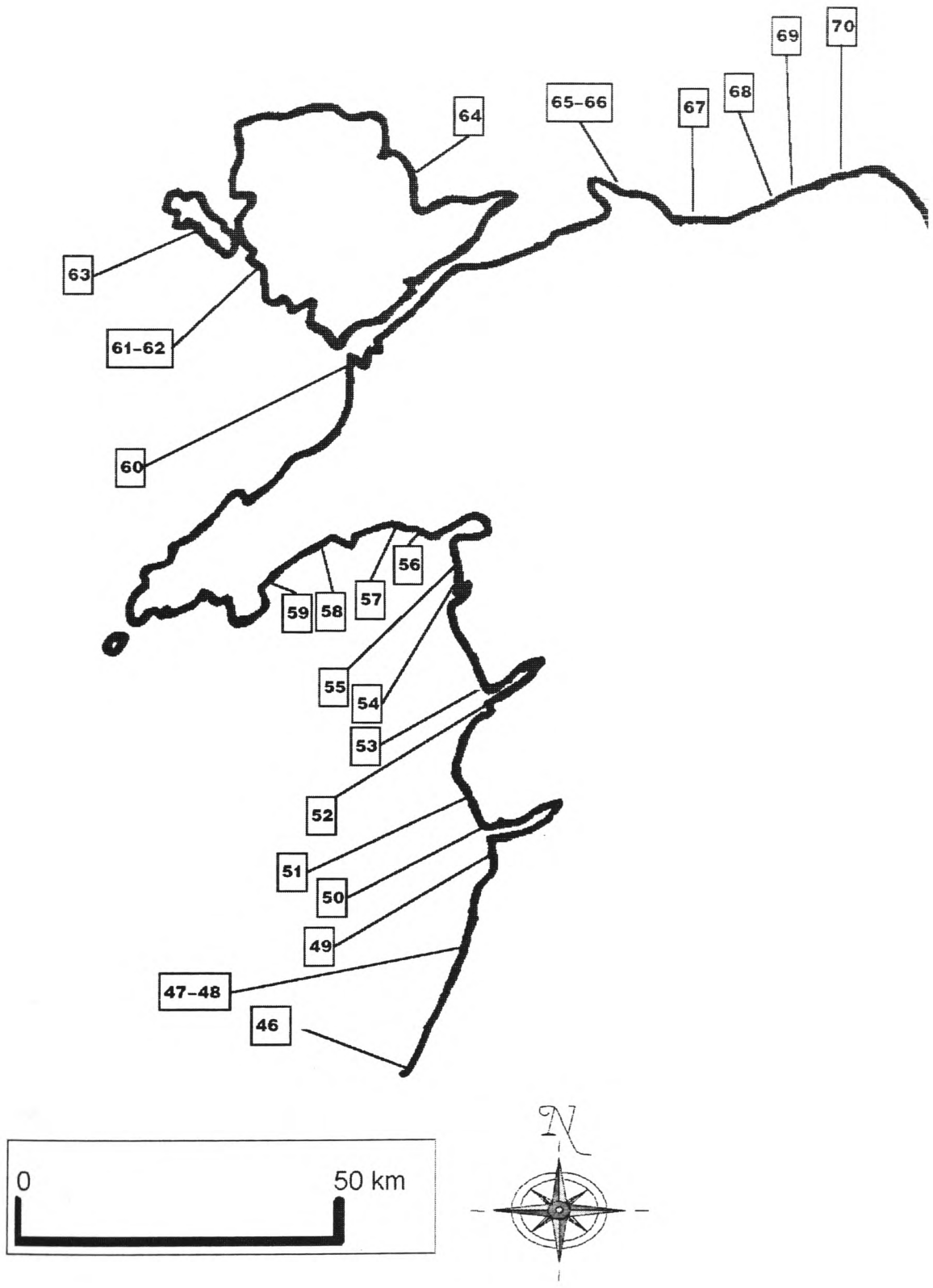


Fig. 3.2b Location of the 70 Beaches Featured in Main Beach Rating Study - Northern Section

Key to Figs. 3.2a and 3.2b

	Beach		Beach
1	St. Mary's Well Bay	36	Broad Haven
2	Jackson's Bay (Barry)	37	Newgale Sands
3	Whitmore Bay (Barry)	38	Caerfai Bay
4	Cold Knap (Barry)	39	Whitesands Bay
5	Llantwit Major	40	Abereiddi Bay
6	Nash	41	Newport Sands - North
7	Southerndown	42	Poppit Sands - West
8	Ogmore	43	Mwnt
9	Newton Bay (Porthcawl)	44	Llangranog
10	Trecco Bay (Porthcawl)	45	New Quay
11	Sandy Bay (Porthcawl)	46	Aberaeron
12	Rest Bay (Porthcawl)	47	Aberystwyth - South
13	Aberafan	48	Aberystwyth - North
14	Swansea Bay	49	Borth
15	Mumbles	50	Aberdyfi
16	Bracelet Bay	51	Tywyn
17	Langland Bay	52	Fairbourne
18	Caswell Bay	53	Barmouth
19	Three Cliffs Bay	54	Llandanwg
20	Oxwich	55	Harlech
21	Port Eynon	56	Morfa Bychan
22	Rhossili	57	Criccieth
23	Pembray	58	Pwllheli
24	Pendine	59	Abersoch
25	Amroth	60	Dinas Dinlli
26	Wiseman's Bridge	61	Rhosneigr - Traeth Llydan
27	Saundersfoot	62	Rhosneigr - Traeth Crigyll
28	Tenby - North	63	Trearddur Bay
29	Tenby - South	64	Benllech
30	Lydstep Haven	65	Llandudno - West
31	Manorbier	66	Llandudno - North
32	Freshwater East	67	Colwyn Bay
33	Barafundle Bay	68	Kinmel Bay
34	Broadhaven (S. Pembs.)	69	Rhyl
35	Marloes Sands	70	Prestatyn

Following designation as a Rural Recreation Area, the coastline between Barry and Penarth has been made the subject of a Local Plan by the Vale of Glamorgan Borough Council (1980), and has been declared a Coastal Conservation Area (Williams, 1990). Along this stretch of coast, low cliffs occasionally rise to 45 m. Geological interest is reflected in the SSSI designations of most of Sully Island and the coast between Sawbridge Bay and Lower Penarth. Permanent caravan and chalet sites have been established on the cliff top which during peak periods accommodate up to 2000 visitors per day (Vale of Glamorgan Borough Council, 1980).

3.3 Glamorgan Heritage Coast (GHC)

The Lias series is the dominant rock series of the GHC and can be divided into 3 zones (Trueman, 1922) :

Bucklandi - 60 m of nodular limestones and shales (mainly limestones). It forms the main cliff line east of Nash Point.

Angulata - 30 m of shales with some limestones (mainly shales). It forms the main cliff base in the west of the study area.

Planorbis - 15 m of alternating bands of limestones and shales.

The lower littoral Liassic deposit, about 6m in thickness, is a massive pale-cream limestone called the Sutton stone. The beds are approximately horizontal with numerous faults and joints, with high-angle gravity faults predominating. There has been much speculation as to the cause of the limestone/shale alternation (Hallam, 1960). The limestones and shales have been classified as "very strong" and "moderately weak" respectively, on the Geological Society of London strength designation scale. The shales contain a high proportion of calcium carbonate and range from soft clays to laminated sediments and siltstones. Faulting is abundant, and discontinuities are also common,

occurring horizontally within the shales or vertically through the limestones and shales, sometimes bisecting the cliff face to its full height (Grimes, 1986).

The presence of rock discontinuities is a highly significant determinant of instability (Williams & Davies, 1984, 1987; Davies & Williams, 1991a), and makes cliff material especially prone to marine and sub-aerial attack. Cliff instability has been highlighted as a danger to beach users along much of the GHC (Williams & Davies, 1980, 1984, 1987; Davies *et al.*, 1991). In the context of this study, unstable cliffs were present at Southerndown, Nash and Llantwit.

Using a variety of methods, average cliff recession rates for the GHC have been calculated as 5 - 50 cm per annum by various workers (e.g. Williams & Davies, 1987). The remains of a small South Wales port 200 m offshore at Llantwit, abandoned in the 16th century, emphasise the extent of cliff recession along this stretch of coast (Davies and Williams, 1991b). This recession has been the major contributor to the development of the coarse clastic sediment sinks which characterise much of the intertidal zone of the coastline, and has resulted in the formation of shingle banks at the back of most beaches along this stretch of coast.

Sand input, some 17 x 10^3 m^3 (42 x 10^3 tonnes) per annum, mainly derived from Devonian sediments, is small compared with the volume of fluvioglacially and fluvially derived sand contained in the relict offshore sandbanks, and movement is limited to pocket bays where local headland crenulations trap sediments (Davies & Williams, 1991b). Dunraven beach at Southerndown is an example of a trapped sand beach of this type. Little is known regarding long-term sand loss at the various beaches. The dominant sand pathway at low tide from the offshore sandbanks is thought to be towards the shore (Harris, 1984), and these serve as a sand source for beach and dune field replenishment in this area. At Llantwit beach the thin veneer of sand present has an offshore source, and also at Nash where the Nash sandbank contributes to the small amount of sand on the beach. At Ogmore, sand is derived from the Merthyr Mawr dunes, the Ogmore river and

offshore sources. Sediment movement around the offshore sandbanks is highly debatable. Parker & Kirby (1982), have indicated a complex pattern of sand sediment circulation in the Severn Estuary.

At the western extremity of the GHC, between the mouth of the Ogmore river and Porthcawl, lies the 360 Ha Merthyr Mawr dune system, designated an SSSI in 1953. This is made up of sand derived from periglacial material washed down into the Severn Estuary about 10 000 years B.P. (Williams, 1986). Since the decimation of the rabbit population by myximatosis in the 1950's, the system has become about 90% vegetated, with a large population of calcicolous plants (including 6 orchid species), and large numbers of bryophytes, grasses and herbs.

3.4 Porthcawl to Swansea

Porthcawl is one of South Wales' most popular tourist resorts, featuring 4 beaches of contrasting character. The most easterly is the part-sand, part-rock Newton beach, featuring few dedicated tourist facilities apart from those within the nearby Trecco Bay caravan park. Trecco Bay itself has a large, sandy beach, immediately overlooked by Europe's largest residential caravan park. Sandy Bay (popularly known as Coney Beach), is the most heavily used of the Porthcawl beaches. It is dominated by the Coney Beach funfair/leisure park with its associated commercial facilities. In sharp contrast, Rest Bay offers a comparatively peaceful beach environment backed by a quiet residential area with limited facilities to support beach users. The sand beach features rock outcrops and low limestone cliffs (up to 10 m).

Kenfig NNR encompasses a dune system fronted by a long (4 km), but little used sand beach dominated by a large chemical plant and Port Talbot Steel Works. The beach at Aberafan again features a large expanse of sand backed by a sea wall, but as with Swansea and its fine sea front, the beach is now largely ignored in favour of those on the Gower Peninsula (Williams, 1990).

3.5 Gower

The Gower Peninsula was the UK's first (1956), designated Area of Outstanding Natural Beauty (Morgan & Williams, 1995), and owes its designation to its exceptional landscape quality and beauty. These qualities are responsible for the area's attraction as a holiday destination and recreation area. The dramatic Carboniferous limestone cliffs of the southern coast contrast with the northern coast which has extensive areas of salt marsh (Swansea City Council, 1987). The southern limestone coast is subject to the most intense visitor pressure centred around the main tourist resorts of Mumbles, Oxwich and Port Eynon. West of Mumbles, the availability of organised accommodation drops dramatically and the majority of tourists in the western half of the peninsula are campers or caravanners (McCrickard, 1994). Effects are most noticeable on the fragile sand dunes which are subject to protection measures. Natural erosion processes also affect these sites.

Geologically, the bulk of the Gower Peninsula is a Carboniferous limestone plateau 60m high. There are Devonian Old Red Sandstone anticlines at Rhossili, Llanmadoc and Cefn-Bryn rising to a height of over 180 m. There are three Millstone Grit synclines at Port Eynon, Oxwich and Oystermouth (Mumbles). Bays at Oxwich and Port Eynon have been eroded from softer overlying shales (Swansea City Council, 1987).

Gower's role is to provide for beach activity, countryside related recreation and appropriately scaled accommodation. Approximately 2 million visitors per annum are attracted by good road links and the proximity to the large population centres of South Wales (Mullard *et al.*, 1996). As might be expected for most Welsh beaches, the number of visitors on Gower peaks during the latter half of July and during August (Swansea City Council, 1987). Maximum levels appear to be self-regulating with car park capacities and road congestion determining saturation point. This tends to occur during Bank Holidays and weekends during periods of fine settled weather conditions (Swansea City Council, 1987). Water

sports form a major part of recreation on Gower; water skiing, motor boats, surfing, windsurfing, sailing, fishing, sailboarding, jet-skiing, swimming and sub-aqua are all popular sports.

Mumbles is a traditional bustling seaside resort with hotels and many eating and drinking places and is the most intensely used recreation area in the Gower. The east facing beach consists of sand, gravel, cobble and mud and is completely enclosed by seawall. The beach itself is not popular with tourists, who prefer the sand beaches further west (McCrickard, 1994).

The popular sandy bays of Caswell and Langland, which are sheltered by limestone cliffs, and the small rocky bays of Limeslade and Bracelet are close to the urban area of Swansea. City Council controlled car parks exist at Bracelet, Langland and Caswell (Swansea City Council, 1987). The Pwlldu/Brandy Cove area forms one of the more remote coastal stretches of Gower due to its poor vehicular access. It is dominated by limestone cliffs, steep coastal slopes and two secluded bays. Despite poor access the two beaches are popular during summer months (Swansea City Council, 1987). These are used more by the local population of Swansea than by holiday makers and distant day trippers.

Pennard cliffs and Three Cliffs Bay form one of the most spectacular sections of coastline on Gower, notable both for landscape and coastal flora. Sand from the open beach has migrated inland to produce cliff top dunes and a steep sided valley which is an SSSI (Swansea City Council, 1987). The valley is overlooked by Pennard Castle.

The Oxwich and Penrice area is one of the main tourist and visitor attractions on Gower. A large car park on the foreshore at Oxwich can accommodate 1000 cars. Much of the sandy beach together with Oxwich Burrows, Oxwich Marsh and Nicholaston Woods form the Oxwich NNR. This was created in 1962 and covers about 289 ha (Mullard *et al.*, 1996). Oxwich Bay has a sandy beach 3 km long backed by a dune system showing the full ecological sequence of

succession from mobile dune to grassland. Oxwich Point forms the southern extremity of the Bay and then continues westward as a rocky shoreline with coastal slopes and limestone cliffs to a small sandy bay at Slade.

Port Eynon is the most popular tourist and visitor destination in Gower, with a high concentration of caravan and camping sites (Swansea City Council, 1987). Pressure on this area is great and similar pressure is felt on dunes at the rear of the sand beach. Port Eynon Point, Overton Mere and Overton Cliffs form part of the Gower Coast (Rhossili to Port Eynon) SSSI. The stretch of coast between Overton and Mewslade comprises some 5 km of dramatic limestone cliffs, rock bays and headlands, but is without sand beaches.

The sand beaches of Rhossili, Fall Bay and Mewslade are popular tourist destinations which lead to pressure for parking and accommodation facilities within the area. Rhossili Bay is the most expansive beach on the Gower, being some 5 km in length. The Bay is backed by sand dunes and burrows. Access is down the cliff path from Rhossili village, over the burrows from Broughton or via the caravan site at Hillend (Llangennith). A NNR of 44 ha covers Worms Head and adjacent mainland cliffs. Llangennith is a popular area for seasonal visitors and one of the main concentrations of camping and caravanning sites in Gower (Swansea City Council, 1987). Access to the beach is via fenced footpaths through the Burrows.

3.6 South Dyfed Coast

Immediately west of the muddy Lougher Estuary lie the industrial beach areas of Llanelli and Burry Port. Although hardly used for tourism at present, this coastal area is the subject of an ambitious multi-use coastal park development plan featuring wetlands, golf course, marina, visitor centre and accommodation sites (Llanelli Joint Venture, 1995). The popular Pembray Country Park is fronted by the beach of Cefn Sidan Sands with its wide (up to 1 km at low tide), 10 km expanse of sand stretching from the Lougher Estuary to the Tywi Estuary. Basic

day visitor tourist facilities for beach users are sited within the park, hidden from direct view of, but within close proximity to the beach. Immediately west of the mouth of the Tywi Estuary, Pendine Sands stretch westwards for 6 km to just beyond the small resort village of Pendine. Most of the Sands from a point immediately to the east of the village, are periodically closed to visitors as a result of military activity.

3.7 Pembrokeshire Coast National Park

The Pembrokeshire Coast National Park (PCNP) occupies an area of 582 km^2 and was designated in 1952 (PCNP, 1994). Although several other National Parks in England and Wales incorporate some coastal areas, the PCNP is the only one primarily centred on the coastline. Fifty eight SSSI's are wholly or partly within the Park and cover approximately 8,900 hectares (PCNP, 1994). These sites cover approximately 60% of the open coastline of the Park, emphasising the great natural interest of this area's coast. There are two coastal NNR's (Stackpole and Skomer), and also the Skomer Marine Nature Reserve, covering 27 km^2 of seabed. Much of the coastline within the PCNP is also designated as Heritage Coast, but the conservation aspects of this designation are subsumed by those applying to the National Park itself. The Park's offshore islands and mainland cliffs are nationally renowned for flowering plants and rare birds, and internationally important for gannet, Manx shearwater and storm petrel breeding.

The PCNP receives an estimated 13 million "visitor days" per year, reflecting the Park's importance as a holiday destination (PCNP, 1994). About 90% of recreational activity during the peak summer period is attributable to holiday visitors, mainly attracted partly or wholly by the coast itself. Accommodation for approximately 75 000 visitors is available within the Park, comprising 41% in static caravans, 20% self-catering accommodation, 18% touring caravan pitches, 13% hotels, etc, and 9% tent sites. About one third of these are located in the immediate vicinity of Tenby and Saundersfoot. In 1990, most peak season visitors were drawn from the south of England (26%) and West Midlands

(20%), with only 1% of visitors originating from overseas (PCNP, 1994). A 1995 peak season survey of South Pembrokeshire beaches showed 60% of visitors originating from England and only 2% from outside England and Wales (Young *et al.*, 1996). As well as general beach use, significant numbers participate in water based sports, particularly sea-angling, wind surfing, surfing, sailing and sub-aqua diving (PCNP, 1994). The southern and western coastlines of the Park are notable for beaches of varying character, ranging from long sand expanses fringing the west of Carmarthen Bay, to pocket beaches interspersed with cliffs further west. The Park's northern coastline contains fewer beaches and is famous for spectacular and geologically, nationally important cliff formations. The clarity of the seawater compared to that of the Central and Inner Bristol Channel waters off south-east Wales, is also notable.

The Pembrokeshire Coast National Park is of outstanding geological interest because of its almost unbroken continuity of rock exposures along the coast and wide range of rock types and formations (PCNP, 1977), ranging from Pre-Cambrian to Late Carboniferous. Generally, the oldest rocks are exposed at the surface north of St. Brides Bay. These are mainly rocks of the Cambrian, Ordovician and Silurian systems. Outcrops of Pre-Cambrian rocks are found south of Broad Haven and adjacent to Ramsey Island. The Pre-Cambrian and Lower Palaeozoics have been severely folded and faulted and these structures are superbly displayed along the cliffed coastline (PCNP, 1977). Raised beach remnants formed before the last Ice Age occur along the indented margins of the coastal plateau, suggesting that the coastline assumed its present general configuration before the last glaciation.

Amroth lies near the south-eastern extremity of the Park and is a typical small village resort with a mixed sand and pebble beach, featuring many wooden groynes. West of Amroth lies the sand and rock beach at Wiseman's Bridge, with its few, basic facilities.

Alongside Tenby, Saundersfoot is the National Park's premier seaside resort. There is a substantial commercial core of shops and businesses related to the tourist industry. The fine, sand beach is about 4 km long and backed by shingle in places. Tenby's two beaches are of contrasting appearance but are both very popular during the summer season. The North Beach lies at the base of steep cliffs almost 50 m high and is accessed by a steep, ramped path along which are found refreshment, toilet, first aid and other facilities. The South Beach is backed by burrows and extends 2.5 km from the town itself to Giltar Point.

Lydstep Haven is a privately owned beach consisting of sand and pebbles backed by wooded cliffs at either end and a caravan park with holiday centre in the middle. The only tourist facilities except for parking are those provided within the holiday centre/caravan park. Manorbier Bay, which forms part of the South Pembrokeshire Heritage Coast, is located 500 m south-west of the small village of Manorbier (population approximately 260). Standing between the two is a twelfth century Norman castle, itself a visitor attraction. There is a car park at the beach, but other facilities are only to be found in the village itself. The mixed sand and rock beach (approximately 700 m in length at low tide), is notable for rock pools and cliff views.

Freshwater East is a large (1.5 km), sand beach protected from prevailing winds by extensive sand dunes. Access is via a steep road. Basic tourist facilities consist of a car park, shop and toilet. Barafundle and Broad Haven (near Bosherton), are two pocket sand beaches located on National Trust land. The isolation of Barafundle Bay - access is via a 1 km cliff top path and steep descent to the beach - has helped to preserve its natural beauty and limit visitor numbers. Basic facilities are present at the car park, 1 km from the beach. Broad Haven's beach is similar in appearance and character but facilities are more convenient, being situated in the car park immediately above the beach. The sharp pinnacle of Star Rock, 100 m offshore, is a notable and attractive feature of the beach scenery.

The remainder of the south Pembrokeshire coast extends around to the industrial complexes of Pembroke Dock and Milford Haven. This coast is mainly rocky in character, interrupted only by the sands and dunes of Frainslake and Freshwater West. West of Milford Haven lies the village of Marloes and adjacent beach of Marloes Sands. Over 2 km of sand interspersed with rock outcrops lie at the base of cliffs up to 50 m high. There are no facilities other than a National Trust car park.

The west-facing beaches of St. Brides Bay offer clear water and fine bathing when calm, but Atlantic storm winds can produce spectacular breakers causing the beaches to be popular for surfing, wind-surfing and other water sports. Broad Haven is another small village resort characterised by a few hotels, shops and modest commercial tourist facilities. Further north lies Newgale Sands (4 km long), flanked by a minor road dotted with car parks, caravan sites and scattered, basic facilities. Despite its lack of commercial development, the beach is patrolled by lifeguards and regularly cleaned.

Immediately south of the city of St. David's (Britain's smallest), lies the tiny pocket beach of Caerfai Bay. The beach has its own car park but all other facilities are in St David's itself. West of St. David's lies the popular Whitesands Bay. A cafe, shop, toilets, lifeguard patrol and large car park are provided to cater for visitors to this frequently busy beach. One of north Pembrokeshire's few beaches, Abereiddi Bay is formed of pebbles and sand formed of pounded grey slate. A car park and toilet are provided but no other permanent refreshment or other facilities. Pwllgwaelod, 2 km south of Dinas Head, is another tiny pocket beach with minimal facilities of toilet, public house and car park.

Newport Sands stretch for 2 km north of the town of Newport, at the mouth of the Nyfer Estuary. Most resort facilities are situated within the town, but there are also car parks, conveniences and refreshments available in the vicinity of the beaches each side of the Estuary. To reach the sands to the north of the Estuary (Cesig Duon) from Newport requires a circuitous 6 km journey by car, but is much

shorter via the coastal footpath. Poppit Sands also flank the mouth of an Estuary, this time the Teifi near the market town of Cardigan. Again, there are sands each side of the Estuary mouth without a direct road link between them. The mouth of this Estuary marks the north-eastern limit of the Pembrokeshire Coast National Park. The main beach facilities are located adjacent to the western sands, with lifeguard patrol, cafe, toilets, car park, etc. The sands to the east of the Estuary lie outside the National Park and are not developed for beach tourism, with only a car park provided. The northern limit of the sands here also mark the start of the Ceredigion Heritage Coast.

3.8 Ceredigion

Heritage Coast status was granted to 4 separate sections of the Ceredigion coastline, totalling 34 km, in December 1982. Together these form the "Ceredigion Heritage Coast", but all coastline between the 4 defined sections is managed as if Heritage Coast status applied to it. Until 1996, all the Ceredigion Heritage Coast was within, and was the responsibility of, Ceredigion District Council. A Heritage Coast Project Officer was appointed in 1985.

The Ceredigion Marine Heritage Coast was the first area in Britain to receive this designation (1992). It extends for 16 km from Tresaith, 2 km east of Aberporth to New Quay Head. The designation recognised the unspoilt nature of the coastline and its importance for wildlife. The coastal waters are home to bottlenose dolphins, harbour porpoise, grey seals, many seabirds and fish (Ceredigion District Council, 1992).

The Ceredigion Coast is a 100 km arc which has some 60,000 year round inhabitants. Summer visitor journeys total some 1.5 million, with the beaches forming the basis for the tourist economy (Ceredigion District Council, 1992). Large resorts such as New Quay and Aberystwyth are mixed with smaller beach resorts and cliffed coastline up to 120 m in height. Williams and Morgan (1995) investigated beach user socio-demographics (n = 1053), at 7 Ceredigion beaches.

Heritage Coast awareness was found to be low (40%), possibly due to the large proportion of visitors coming from outside Wales (54%).

The southernmost important beach in the Ceredigion Heritage Coast area is Mwnt. This is another small pocket sand beach set in a mainly cliffed area of coastline. Rocks adjoining the beach provide popular vantage points for fishing, and the area is also a haven for seals (Ceredigion District Council, 1991). Facilities consist of car parking, toilets and basic refreshments in summer.

The small resorts of Aberporth and Tresaith feature north facing, sand beaches and are connected by a coastal footpath, frequented by residents of the many nearby caravan developments. In spite of its status as a small village (population approximately 250), Llangranog is one of the most popular resorts on the coast of Cardigan Bay (Ceredigion District Council, 1991). The sand beach is backed by unstable, folded shale cliffs. This rock has weathered to form caves outcrops and impressive stacks, one of which is a notable landmark of the beach, Carreg Bica.

The next 10 km of coastline consists of almost unbroken cliff and remote coastline, until New Quay is reached. New Quay is a busy holiday resort located on the steep leeward slope of New Quay Head. The resort has three beaches, each with its own character and attractions. Traeth y Dolau to the north is a predominantly rock beach backed by shale cliffs. The main harbour beach has deep sand and offers bathing and boating facilities. Extending around New Quay Bay for more than 2 km at low tide, Treathgwyn is a gently sloping beach backed by boulder clay cliffs.

The 8 km stretch between New Quay and Aberaeron has several visitor access points, amongst which is the small sandy beach of Cei-bach. This stretch remains relatively undeveloped, with attractive coastal scenery and sites of conservation interest. Formerly a thriving port, Aberaeron is now a significant holiday centre noted for its architectural quality (Ceredigion District Council, 1991).

The two beaches, north and south of the small harbour, are composed mainly of stones and pebbles washed out of the boulder clay on which Aberaeron is built. The southern beach is more popular with sandy areas exposed at low tide. The area surrounding Aberaeron is notable for the number of caravan developments (Williams and Morgan, in press).

North of Aberaeron stretching to Llanrhystud, is a 13 km stretch of remote, unspoilt and often rugged coastline containing several SSSI's and also other sites of nature interest. In this area cliffs attain a height of up to 120 m (Jones & Williams, 1991). Llanrystud itself has an extensive beach of boulders and pebbles, overlooked by two camping/caravan sites. Another 13 km of mainly cliffed and rocky coast extend to just south of Aberystwyth. Tan -y-bwlch is a 2 km long crescent shaped beach of shingle and sand, immediately south of Aberystwyth harbour. The shore is a popular walking area but strong offshore currents make bathing dangerous. Aberystwyth itself is a busy commercial and tourist centre with two beaches; the South Beach between the town and harbour and the North Beach stretching northwards from the small pier. Both beaches are composed of a mixture of sand and shingle, backed by sea walls. The South Beach has few dedicated facilities, although the town itself is nearby. The North Beach is backed by the hotels, guest houses and various refreshment and entertainment facilities associated with a medium-sized resort.

The village of Borth halfway along the Cardigan Bay coast, boasts 5 km of sand beach divided by wooden groynes. The beach is popular for sea angling and sailing, as well as walking and general beach leisure (Ceredigion District Council, 1991). Toilets are available at both ends of the beach, with car parking, shops and refreshment facilities scattered along its length. Further north, Borth Sands merges with the dune system (a National Nature Reserve), of Ynys Las. The dunes here are still expanding, partly in response to groyne building during the 1970's and '80's (Ceredigion District Council, 1991). The area is popular as a result of the large, new (1995), Reserve Visitor Centre and the expanse of fine, dry sand fringing the dune system.

3.9 Northern Cardigan Bay & Lleyn

Aberdyfi is a typical small resort town situated on the north bank of the Dyfi Estuary. It is also within and marks the southern coastal limit of, the Snowdonia National Park. The sand beach stretches for 5 km west then north-west from the town. It is backed firstly by the coastal railway line and road (A493), then further north by dunes incorporating a golf course. The beach extends unbroken to the outskirts of the town of Tywyn. This is another small resort town, but of different character to Aberdyfi. It features several large caravan sites and a mixed pebble/sand beach divided by many groynes. The beach changes to a more pebbly nature north of the town, towards the mouth of the Afon Dysynni.

Some 10 km of little used pebbly coastline lead north to the small town of Fairbourne. The town supplies a few basic tourist facilities (hotel, car parking, etc.), for users of the 3 km long sand beach. In its northern section the beach is backed by a spit of land extending into the mouth of the Mawddach Estuary. On the north bank of the estuary lies Barmouth. Although this is only 1 km away from the northern extremity of Fairbourne's beach, road access requires a journey of 25 km. The sand beach immediately in front of the town of Barmouth is divided by many groynes, but at low tide it is in places up to 1 km wide. The sand beach extends for over 15 km north, backed by numerous caravan and camping sites.

The village of Llandanwg provides only the most basic facilities (car park, toilets, basic refreshments), for beach visitors. The beach itself is partly sand, turning to pebbles further north. The town of Harlech is 1 km inland and better known for its 13th century castle and historical connections than beach tourism. However, it has a fine, long (7 km), sand beach backed by a golf course and extensive dunes. Only car parking and toilets are provided at the beach itself however, other facilities being located in the town. The beach can be considered to end at Harlech Point, at the mouth of the Glaslyn Estuary. This estuary can be considered to mark the start of the Llyn Peninsula.

Morfa Bychan lies 3 km along a minor road from Portmadog. It is essentially a holiday centre based on static caravans, although there are also sites for camping and touring caravans. The beach, also known as Black Rock Sands, extends from the mouth of the Glaslyn Estuary for more than 3 km and in places is over 1 km wide at low tide. Cricceith is notable for its fine 13th century castle ruins immediately overlooking the narrow, mixed sand and pebble beach. There are modest facilities for beach users and other visitors. Morfa Abererch is a long (4 km), south facing sand and pebble beach. It has a camping/caravan site but the beach itself is remote and devoid of on-site tourist facilities.

The popular tourist resort of Pwllheli has beaches either side of its sheltered harbour, facing both east and south. The south beach (Marian-y-de) is the most popular, although it is narrow and a mixture of sand and pebbles. All main facilities are provided in the vicinity of the beach. The town of Abersoch is the westernmost important resort on the Llyn Peninsula, marking the end of the "A" road network on the peninsula. There are wide, east facing sand beaches both north and south of the town. The beach immediately in front of the town is narrower, but provided with basic facilities for beach users.

The north coast of Llyn is remote from main transport communication channels and consists mainly of small, rural communities. Much of the coast is rocky, but there are some pocket sand beaches. Morfa Nefyn is one of the largest of these (2 km), and provides car parking, hotel and other basic facilities for visitors. At the northern extremity of Llyn lies the beach at Dinas Dinlle. This beach faces west and is composed of a mixture of sand and pebble, backed by a high pebble storm beach which has been reinforced with larger rocks for flood defence purposes. Immediately behind this is the minor, coastal road, car parking, a caravan site and the most basic tourist facilities.

3.10 Anglesey & N. Wales Coast

Rhosneigr is one of Anglesey's most important tourist centres and beach visitors play a vital part in maintaining the town's economy. There are two main beaches, located either side of the rocky outcrop of Cerrig-y-brain. To the south lies Treath Llydan, a 1 km long sand beach backed by dunes. To the north and immediately in front of the town is Traeth Crigyll, a sand beach with several large rock outcrops.

Trearddur is a small village on Holy Island, which is linked to the Anglesey "mainland" by a causeway. Trearddur Bay consists of a small (300 m) pocket sand beach with rock platforms extending further north. Visitors are catered for by provision of hotels, a caravan/camping site, car parking and refreshment services. Benllech is situated on Anglesey's east coast. The large town has a 1.5km north-east facing beach of sand, for which the town supplies all essential visitor facilities.

The North Wales coast is host to a number of famous resorts dating from the birth of British coastal tourism in the Victorian period. Many have suffered decline in recent years, but completion of improvements to the A55 trunk road linking the North Wales coast to the national motorway network offers opportunity for improvement in their fortunes. Heavy, almost ribbon-like urban development of the coastal strip is a feature of the coastline from Great Ormes Head in the west to Point of Ayr, a distance of over 35 km.

The westernmost of the major resorts is Llandudno, with beaches situated either side of the town. The west beach is backed by residential areas and golf courses while the main commercial area of the town is fronted by the heavily used and well developed north-east beach. A wide promenade and many large groynes are prominent features of the beach. All major commercial and tourist facilities for users are provided in the immediate vicinity of the beach, although to reach many of them there is a major road (A546) to be crossed.

The town of Colwyn Bay and associated conurbations extend for some 5 km along the North Wales coastal strip. The urban area is fronted by a promenade and sand beach, but this area is less popular than many other North Wales resorts and dedicated beach tourist facilities are surprisingly few. Kinmel Bay is one of the smaller resorts in this area. The beach itself is provided with car parking and basic visitor facilities but the main urban area is set back from the shore, giving the beach a somewhat different ambience to many of the other North Wales resorts.

In contrast, the seafront at Rhyl is heavily developed with many modern buildings. Rhyl has sought to boost tourism by the construction of additional attractions in the vicinity of the seafront such as the all-weather Sun Centre and Sea Life Centre. The wide, sand beach is continuous with that of Prestatyn and is in fact uninterrupted as far as Point of Ayr, 15 km distant. Like Rhyl, Prestatyn has also sought to develop additional tourist attractions on its seafront, such as the Nova Centre. The prominent visibility from the beach of such facilities contained in large modern structures, is a notable feature of the resort. All the commercial facilities expected of a large resort are present on the seafront, which also features self-contained holiday complexes.

CHAPTER 4

PILOT STUDY AT THE GLAMORGAN HERITAGE COAST

4.1 Purpose of Pilot Study

The aims of the pilot study were:

i) To develop a questionnaire generated from interviews with beach users, and use this to assess opinions and perceptions of a representative sample of beach users at each of the four GHC "honeypot" sites (Fig. 3.1; see Chapter 4.3), with regard to a wide range of beach environment aspects. From analysis of these data it was hoped that insight would be gained into the concerns, dislikes and preferences of beach users at each site.

ii) To establish the appropriateness of the current Glamorgan Heritage Coast management principles and practices and to see how the opinions and perceptions expressed by beach users might be taken into account in the future management of this area of coast. As a result of this, it was hoped that it would be possible to discover what changes (if any) would be advisable to increase user satisfaction with the beach environment, while still maintaining the quality of the Heritage Coast environment.

iii) To gain insight into how personality and socio-demographic beach user parameters might be related to perception of beach aesthetics and facilities at the four "honeypot" sites.

iv) To develop and refine a model of beach user parameters influencing beach selection.

4.2 Introduction

In 1970 the Countryside Commission published the results of a comprehensive survey of the England and Wales coastline in "The Coastal Heritage". Thirty-four coastal areas were given the new definition of "Heritage Coasts" (Williams & Howden, 1985). Forty-five Heritage Coasts are now (1996) in existence.

Heritage Coast status was granted to the Glamorgan Heritage Coast (GHC) in 1973 as one of 3 pilot schemes involving a new approach to coastal management in England & Wales. The GHC is situated on the northern fringe of the Bristol Channel, UK (Fig .3.1), extending for approximately 22 km between Newton and Gileston. At the time of the study (1991), the GHC was within the counties of Mid and South Glamorgan. These were replaced in 1996 by the unitary authorities (County Boroughs), of Bridgend and the Vale of Glamorgan. Inland, the GHC has been defined to include areas south of road B4265, including at its western extremity the Merthyr Mawr dune system. The success of these pilot schemes led to Heritage Coasts now (1996) covering approximately one third of the coastline of England & Wales. In principle the Heritage Coast approach is recognised internationally as an efficient and effective means of coastal management (Williams & Howden, 1985). However, increasing usage within the GHC area has required regulation of the man/environment interaction by means of management policy (Williams & Sothern, 1986).

4.3 Management Policy and Philosophy

The primary management aim at the GHC is to conserve the quality of the coastal scenery in its natural state, and secondarily to facilitate its enjoyment by the public through recreational activities which accord with the primary aim. Where natural beauty and recreation are in irreconcilable conflict, then the former should prevail. In practice however, a balance has had to be struck between developing recreation too far (so that conservation is impaired), and conserving

absolutely (so that tourism declines). Regarding conservation of environmental resources, the aim is to make the wisest use of all coastal resources rather than to preserve scenic stretches for their own sake while discouraging access (Countryside Commission, 1970). Guidelines for managing Heritage Coasts are set out in "The Coastal Heritage" (Countryside Commission, 1970), and the basic management principles have been enumerated by Williams (1987).

Determination of intensity of use at various locations within the GHC is seen as a valuable aim (Williams, 1987), but acceptable levels of use are difficult to determine. It has been stated that the carrying capacity of the GHC has not yet been exceeded (Williams & Sothern, 1986), but efforts have been made to determine the vulnerability to erosion at various sites, e.g. Merthyr Mawr dunes (Williams & Randerson, 1989).

Management also recognises zones subject to different intensities of usage. Landscape and ecological factors are of great importance for zoning policies within the GHC, and the GHC Management Plan Statement (Glamorgan Heritage Coast Management and Advisory Committee, 1976), recognised 4 key locations zoned for intensive usage, termed "honeypots" (Williams & Howden, 1979); these are the sites of the four study beaches (Dunraven Beach at Southerndown, Nash, Ogmore and Col-Huw Beach at Llantwit; Fig. 3.1). At these sites facilities such as car parking, refreshments and toilets are provided, but with the intention of having the minimum effect on the beauty of the GHC (Morgan *et al.*, 1993). At these sites in particular, increasing usage has required regulation of the man/environment interaction by means of management policy (Williams & Sothern, 1986). The remainder of the coastline is zoned as a remote area giving priority to agriculture, nature conservation, and to the protection of solitude. These areas are therefore maintained in a relatively inaccessible and unspoilt state and the natural amenities of the coastline are safeguarded. Fragile habitats are protected from vehicles and people, and people who enjoy solitude and an absence of vehicles are provided for.

The Countryside Commission (1991), stated that rigorous control should be exercised over all forms of development (including those intended for recreation), that are either incongruous by reason of scale, siting, noise and traffic, or which adversely affect heritage features or remote stretches of coast or access to them. Access is limited at sensitive sites by passive means, e.g. limiting car parking, and by guiding people to the "honeypot" sites by provision of car parks, toilets, refreshments, etc. By the provision of waymarked trails (described in leaflets), casual walkers are guided away from the most sensitive areas.

Landscape improvements should be in keeping with the environment, e.g. improving footpaths, concealing pipelines, repairing derelict buildings, etc. As far as recreation is concerned, "passive" activities such as walking and relaxation are encouraged. Water-skiing, motor cycling, etc, are not considered to be appropriate to the area. The provision of interpretative services aims to promote understanding and interest in the coastal environment, and so use information as a management tool. The Heritage Coast Centre at Dunraven Beach, Southerndown, provides an identifiable focal point as well as providing information on the features and facilities of the coast, and the aims of the project.

The management philosophy is aimed at a positive approach to coastal management, with a close working relationship with farmers, landowners, residents and visitors. Management plans emphasise the concept of voluntary agreements, and rely principally on persuasion of landowners to surrender areas of their land to public usage. There is provision for compulsory purchase to bring key areas into public ownership but this has been invoked on only one occasion for the GHC. Invariably the management authority does not own or want to own, the land for which it takes responsibility.

In terms of management structure, Project Officers were a key element of the Heritage Coast concept at the time of the pilot study (1991). The GHC Project Officer took responsibility for drawing up management plans, organising practical improvement works along the coast, negotiating with local landowners, farmers

and interest groups in order to secure support for the programme and establish voluntary agreements for access and car parking. The GHC Project Officer was also expected to supervise the preparation of interpretative and promotional material and to recruit Rangers and other staff as required. Quarterly reports were submitted to the Countryside Council for Wales (CCW) and responsibility taken for the planning and day-to-day running of the scheme. In all these actions, the Officer was responsible to the Advisory Management Committee. Supplementing the funding provided by the CCW and local authorities was also an important function of the Project Officer (Cullen, 1982; Williams & Howden, 1985).

Now (1996), the permanent GHC staff consists only of 3 Rangers (one being senior to the others). Rangers patrol the coast, provide information and assistance to the public, and enforce bye-laws. They additionally act as information gatherers and carry out maintenance and improvement tasks. In these they are assisted by volunteers who are either local individuals or come from institutions such as schools, colleges and youth groups. There is also a charitable organisation, "Friends of the GHC", who generate funds to assist the work of GHC staff.

The management principles outlined above have the aim of resolving the traditional conflicts of open countryside, which in the case of the GHC, tend to be concentrated into the narrow strip along the coastal fringes, and particularly the "honeypot" sites. At these sites there is pressure due to the conflict of tourism with conservation, especially at Southerndown at holiday weekends.

Heritage Coast policies were reviewed, reiterated and strengthened in 1991 (Countryside Commission, 1991). Particular concern was focused upon the environmental health of the coastline in terms of litter, pollution and water quality, and the social effects of the development of tourism. Of particular note was the view expressed by the Countryside Commission (1991), that all intensively used beaches on Heritage Coasts should be designated as bathing beaches and comply with the EC Bathing Water Directive (76/160/EEC).

4.4 Previous Visitor Studies at the GHC

Williams & Randerson (1989) conducted a large survey (n = 2,400), of visitors to the Merthyr Mawr dune system, looking at a limited range of parameters including journey origin and Heritage Coast awareness. The bulk of visitors were found to be from the north-east quadrant of South Wales and the immediate area, and were most often visiting the dune area for the purposes of walking and children's play.

Psychological profiles of beach/dune users (n = 59), at the Merthyr Mawr dune complex and adjacent Newton beach were studied by Williams *et al.,* (1992), and showed a significant difference between users of these two domains. Compared to beach users, dune users were found to be more likely to live in the local area, be of introverted personality type, have internal locus of control, and visit the dunes alone or in small groups. It was felt dune users would appreciate information boards regarding dune genesis, vegetation, etc, whereas beach users would take little interest in such information. At the time of the study, such information boards were present in the beach area only.

With regard to beaches examined in this study, the only user survey of note was that conducted by Williams & Sothern (1986), at Southerndown and Llantwit. A range of visitor parameters including Heritage Coast awareness, age, length of stay, socio-economic status, frequency of visit and mode of transport were examined. The importance of the motor car as a means of transport to these sites was emphasised, with most journeys to the sites taking less than an hour. However, beach user opinions were not examined in this study.

4.5 Methodology

4.5.1 Sampling

The nature of the main survey, particularly the requirement that a random sample of the population present on each study beach should be questioned, posed severe methodological difficulties.

(i) The beach areas were busy with many people moving from place to place, making it difficult to target particular individuals for interview. This made it difficult to obtain a genuinely random sample of the total beach user population in terms of the parameters of age, gender socio-economic status, personality parameters, etc.

(ii) Some people were unsuitable respondents because of the activities they were engaged in, e.g. swimming, sleeping, eating.

(iii) A true stratified sample should be representative of the target population (all beach users), but since this population is so fluid, it is extremely difficult to define. In this study an approximation to a stratified sample was obtained by approaching groups, couples and individuals of a variety of ages and both sexes.

(iv) In asking members of the public to complete any questionnaire, one is relying on them to give honest and truthful answers to the questions posed; however this may not always be the case. There is an ever-present danger that people may feel obliged to provide answers of a type which they believe the surveyor wants or expects to receive. They may also, one suspects (especially in the case of the questions designed to assess personality), try to provide answers which they believe will present a good impression of themselves, and try to conceal certain aspects of their personality, especially those which they believe other people may consider

undesirable. This problem of "faking good" has been noted by Eysenck & Eysenck (1963).

The problems and drawbacks described above should be constantly born in mind while considering the results, but due to the pioneering nature of this work and logistic constraints, they were largely unavoidable.

4.5.2 Initial Interviews

A tape recorder was taken to the four beaches to be surveyed, Southerndown (Dunraven), Nash, Ogmore and Llantwit (Col-huw), (Fig. 3.1), during the summer months, to seek beach users' opinions on beaches in general, and also the particular beach they were using at that time. Interviews were conducted during the late morning and afternoon on days of fine weather, when reasonably large numbers of beach users were present. Six to eight adult groups, couples or individuals and one or two children were interviewed at each beach. The questions asked were as shown in Table 4.1.

1)	What do you like about coming to the beach in general?
2)	Why have you come to this beach in particular?
3)	What do you like and dislike about this particular beach?
4)	Do you think that anything is missing from the beach, in terms of facilities or anything else?
5)	Do you think that there is anything here that is unnecessary?
6)	What do you think children want from a visit to the beach?

Table 4.1 Questions Put to GHC Beach Users in Tape Recorded Interviews

Questions were asked one at a time, with interviewees encouraged to speak for as long as they wished, but without specific prompting. Where a selected interviewee was part of a family or other group, other members including children often contributed comments, and were encouraged to do so.

4.5.3 Trial Survey

After interview completion, a summary of responses was made from each recorded interview. From these a list of likes and dislikes of beach characteristics and features, as expressed by the interviewees, was prepared. Some of these likes and dislikes could be considered to be contradictory between interviewees to some extent, indicating a divergence of opinion between beach users as to the characteristics and features which they preferred.

From this list, a preliminary questionnaire was prepared for use in a pilot survey (Appendix 1). This was conducted at Ogmore and Southerndown with 10 people surveyed at each beach. After completing each questionnaire, clients were asked if they had experienced any problems in understanding or completing the questionnaire, and what (if any), sections they had found confusing or ambiguous.

Several problems were identified as a result of this survey. It was found that questions which had an "optimum" value at the mid-point of the nine point scale (i.e. "5"), caused confusion when interspersed with questions which had an optimum value at one or the other extreme of the nine point scale. In the final draft of the questionnaire it was decided to separate all questions with a mid-scale optimum value, from those with optima at the scale extremes. It was also found that several clients mistakenly circled "9" instead of "1", for questions where the optimum value had switched from one scale extreme to the other, compared to the previous question. This problem was addressed in the final draft by making "1" the optimum scale value for all questions where the optimum was at an extreme of the nine-point scale.

The open-response question relating to lifeguards (Appendix 1), caused confusion as the simple question "*Why?*" which followed the nine-point scale question relating to lifeguard protection, left many clients uncertain as to what question they were actually being asked. However, it was decided to leave this open-response question in the final questionnaire.

In drafting the final questionnaire, in addition to changes described above, some alterations were also made to the order of the nine point scale questions, in order to bring together questions on the same or related subjects. Some further questions were also added, concerning toilet facilities for the disabled and how the beach compared to the best and worst clients had visited (nine-point scale questions). Open response questions on the best and worst beaches the client had visited, and why they considered these beaches to be good or bad were also added.

4.5.4 Main Pilot Survey

For the main survey, the State-Trait Anxiety Inventory (STAI; Spielberger *et al.*, 1970), and the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975), were added to complete the final composite questionnaire for the main survey. Parameters in the EPQ (Eysenck & Eysenck, 1975), included "extroversion" (E), "psychoticism" (P), and "neuroticism" (N). The STAI parameters were "anxiety state" and "anxiety trait". Eysenck & Eysenck (1975), have described the typical introvert as quiet, reserved and shy, non-participative in relating to other people, not particularly fond of the company of others, and not liking excitement. Such individuals might be expected to choose to congregate in the sorts of leisure environments where they can expect to encounter an appropriate degree of participative behaviour. The "P" scale of "psychoticism" is clinically related to psychosis, featuring bizarre, impersonal, hostile and anti-social behaviour. However, "P" describes a characteristic which is essentially "normal" and which only becomes pathological in extreme cases. Hence "tough-mindedness" has been suggested as a more appropriate term for non-pathological usage (London & Exner, 1978). Neurotic behaviour has been characterised as inflexible and maladaptive. It may be associated with excessive anxiety, irrational fears and a tendency to avoid stress-arousing situations instead of effectively coping with them (Bruno, 1986). Compared to males, females tend to

to have higher "N" scores and (to a lesser extent), lower "E" scores (Hersen & Bellack, 1988).

Spielberger *et al.*, (1970), differentiated between anxiety as a constant condition and anxiety which is specific to situations, and referred to these as "anxiety trait" and "anxiety state" respectively. Spielberger *et al.*, (1970), described "anxiety trait" as an acquired behavioural tendency predisposing the person to perceive a wide range of objectively non-threatening situations as dangerous. "Anxiety state" was defined as a more transitory state of emotional arousal subject to variation in intensity and over time.

Using the final draft of the questionnaire (Appendix 2), 50 persons were surveyed at each of the four study beaches, and also 21 children (aged 10 - 15 years), at Southerndown. Surveying took place during a period of warm, very fine weather (rainfall nil, mean daily maximum temperature = 24°C, average 12 hours sunshine per day), on 26 - 30 August 1991, during late morning and early afternoon.

4.5.5 Data Analysis

Clients were classified by occupation into socio-economic groups 1 to 5 as devised by Stevenson (1928), on the basis of occupations listed by the Office of Population Censuses and Surveys (1980). Students were given a code of 6, unemployed persons and housewives 7, and retired persons 8. Values for the EPQ (Eysenck & Eysenck, 1975) and STAI (Spielberger *et al.*, 1970) parameters were calculated. Question 11 of the anxiety trait determining series of questions ("*I worry about school: hardly-ever/sometimes/often*"; Appendix 2), was excluded from the calculation of the anxiety trait score for clients, as it was felt in retrospect to be inappropriate for adults, most of whom did not attempt an answer. This resulted in the production of a corrected anxiety trait score for each client, obtained by multiplying the total anxiety trait score for the remaining 19 questions, by 20/19, i.e, a multiplication factor of 1.05.

Client data was analysed using the SPSS/PC+ data package (Norusis, 1988). Data was processed to test for significant correlations between a wide range of client parameters, both at individual beaches and for all beaches grouped together. Non-parametric tests (Mann-Whitney U, Kolmogorov-Smirnov, Kruskal-Wallis) were performed to examine the significance of differences in data values obtained for all parameters, between the 4 study beaches, between males and females, and other selected groupings. Relationships between the independent variables of age, sex, occupation, travelling distance, length of stay, knowledge of the Heritage Coast, the 5 personality parameters, and the other (dependent) variables, were examined using the technique of stepwise multiple regression.

4.6 Results and Discussion

In terms of the client parameters of Heritage Coast awareness, length of stay, age breakdown and socio-economic groupings, the study by Williams and Sothern (1986), at Southerndown and Llantwit provided useful comparisons with results of this study, and also an opportunity to examine whether visitor parameters had changed between 1986 and 1991.

4.6.1 Knowledge of Heritage Coast

Heritage Coast awareness appeared to have increased at the study beaches since the study of Williams & Sothern (1986), though perhaps not to the extent that might have been hoped for considering that the Glamorgan Heritage Coast had by the time of this pilot study (1991) been established for 22 years. It was found that 72% of all clients (74% of adults) said that they knew the beach they were on was part of the Heritage Coast. This compared to figures of 68% at Southerndown (76% in this study; Fig. 4.1), and 46% at Llantwit (64% in this study), found by Williams & Sothern (1986). These figures may however, be high in national terms as Williams & Morgan (1995), found a figure of 32% at the

Ceredigion Heritage Coast where there was a low proportion of local visitors to the beaches.

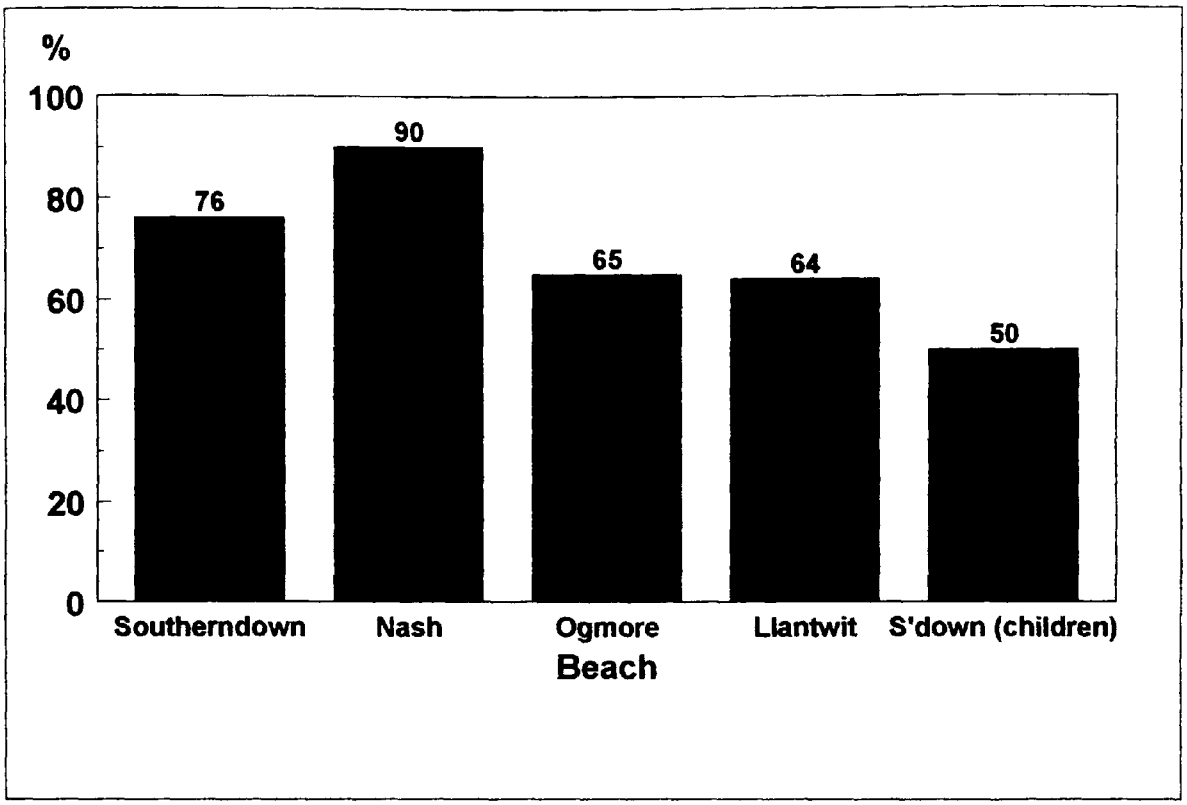


Fig. 4.1 Heritage Coast Awareness at the GHC Study Beaches

It should be noted that the main survey of this study took place on weekdays during the period 26 - 30 August 1991, when a high proportion of visitors from outside the GHC area might have been expected to be present. The study by Williams & Sothern (1986), on the other hand took place over a full 7-day week from 28th June to 4th July, i.e. during term-time for most school pupils. This makes direct comparison of beach user parameters between the two studies less straightforward.

More clients at Nash than at the other 3 study beaches were aware of the Heritage Coast (Fig. 4.1), but reasons for this high awareness level are not easily discerned directly from the data collected in this study. It could be postulated that this beach tends to attract people who are more interested in aspects of the beach

environment other than the traditional beach resort pastimes of sunbathing, swimming, etc. This suggestion is supported by the finding that clients at Nash tended to perceive more (and thus possibly had a greater appreciation of), wildlife and plant life than those at the other study beaches. A higher proportion of such people might be expected to be aware of the Heritage Coast scheme.

The percentage of clients at Southerndown aware that the beach was part of the Heritage Coast (76%; Fig. 4.1), was only a slight increase on the figure of 68% found by Williams & Sothern (1986), in their 1985 survey. This again is disappointing in view of the fact that the Heritage Coast Centre is located at this beach. The Centre is not however, on a direct route from the main (seafront), or overflow car parks to the beach area, and awareness might increase with better signposting of the centre from the sea-front car park and refreshment area, and possibly provision of a noticeboard at this site.

Comparing clients who were aware/not aware of the Heritage Coast, no significant differences ($p < 0.05$), in scores for the personality parameters of extroversion, psychoticism, neuroticism, anxiety state and trait were observed between the two groups. Also, there was no significant difference ($p = 0.308$), in the mean value of socio-economic status of employed clients in the two groups.

Only 64% of Llantwit beach users interviewed in this study were aware that it was part of the Heritage Coast (Fig. 4.1). This was a disappointing figure, in view of the fact that the mean travelling distance of clients to Llantwit was only 17.1 miles (27.6 km), suggesting a high proportion of local beach users. Williams & Sothern (1986), also found a similar picture of visitor origin with 68% of visitors to Llantwit in their survey coming from the county of South Glamorgan, and only 13.6% from outside the Mid/South Glamorgan area. They also found that less than 50% of visitors had travelled for more than 30 minutes to reach this beach. Llantwit lies towards the eastern end of the GHC, and it may be that a high proportion of visitors to this beach at the time of this study were from the Cardiff

conurbation, who may have had little exposure to information and publicity concerning the GHC.

Compared to other visitors, those aware of the GHC tended to be more interested in the views from the paths ($p = 0.049$), considered walks and footpaths in the beach area to be more interesting ($p = 0.007$), were less concerned about shortage of car parking ($p = 0.034$), and perceived a greater variety of wildlife ($p = 0.013$) and plant life ($p = 0.003$). The differences between the two groups may suggest that people who were aware of the fact that the beach they were on was part of the Heritage Coast, were more in sympathy with the management aims of controlling access (for example, by limiting car parking), and limiting impact on the beach environment, and more interested in or aware of wildlife, plant life, paths, etc.

4.6.2 Comparison of Male and Female Clients

Seventy-seven percent of male ($n = 75$) and 69% of female clients ($n = 140$) who responded to the question on Heritage Coast awareness, were aware that the beach they were on was part of the Heritage Coast. This was not a statistically significant difference. Female clients had higher mean scores than males for neuroticism (mean for females = 12.4, mean for males = 8.5, $p = 0.001$). There were no significant differences ($p < 0.05$), between male and female clients for the personality parameters of extroversion, psychoticism, anxiety state and trait. There were several significant differences in perception of beach aesthetic factors and facilities between males and females. These are discussed in Chapter 4.9.

4.6.3 Comparison of Adults and Children at Southerndown

A significantly higher ($p = 0.042$) proportion of adults than children at Southerndown were aware that the beach was part of the Heritage Coast. There were surprisingly few other significant differences. Considering those parameters which did show a significant difference, it was interesting that adult clients

considered the public toilets to be in a cleaner condition than did the children ($p = 0.042$). Children on the other hand, thought the refreshment facilities to be better ($p = 0.033$), and thought that there were more walks in the beach area ($p = 0.033$). It was noteworthy that while for adults at Southerndown there was a correlation ($p = 0.004$), between parameters assessing perceived suitability of the beach for swimming and overall beach rating, for children at the same beach there was no significant correlation ($p = 0.594$) between these two parameters. This suggested that children did not associate the quality of a beach for swimming with overall beach quality in the same way as adults.

At Southerndown a significantly ($p = 0.042$) higher proportion of adults than children (aged 10 - 15), at Southerndown knew that the beach was part of the Heritage Coast; 76% compared to 50%. Although the number of children responding was small ($n = 18$), this result suggests the importance of attempting to communicate the existence of the Heritage Coasts and its philosophy to children of secondary school age. This might also increase environmental awareness of children of this age and bring them into sympathy at an early age with the Heritage Coast concept. It was interesting to see that children at Southerndown regarded the public toilets there to be less clean than did adults. Possibly children of this age have not "learned" to expect low standards of cleanliness in public toilets, whereas adults have, so that a public toilet of moderate cleanliness may provoke a different reaction from the two groups. Refreshment facilities however, were better regarded by the children; possibly children were more easily satisfied by the limited range of refreshments available or the refreshments offered were those appealing to children. Results also suggested that children were less concerned with the sea and swimming when visiting the beach, and more interested in beach play, exploration and other "non-sea" beach activities.

4.6.4 Comparisons Between Beaches

Several significant differences between beaches were considered to be of interest. The only significant difference in socio-economic status for employed

persons between the study beaches was between Nash and Southerndown (Table 4.2); employed persons at Nash tended to be in a higher socio-economic group than those at Southerndown (p = 0.027).

	Southerndown	Nash	Ogmore	Llantwit	Total
I	2	2	1	1	6
II	10	18	9	10	47
III	11	13	16	9	49
IV	8	1	1	5	15
V	1	3	1	1	6
(6)	6	6	2	2	16
(7)	11	6	15	17	49
(8)	1	2	4	5	12
Total	50	51	49	50	200

Key to Table 4.2

Description	Social Class	Description	Social Class
Professional Occupations	I	Unskilled Occupations	V
Intermediate Occupations	II	Students	6
Skilled Occupations	III	Unemployed, housewives	7
Partly Skilled Occupations	IV	Retired	8

Table 4.2 Socio-Economic Groupings of Visitors to GHC Study Beaches

Clients had travelled significantly further to Southerndown than to Llantwit (p = 0.005), and Nash (p = 0.013). Clients at Nash intended to stay on average, for a shorter duration than those at the other beaches (Table 4.3), with the difference between Nash and Southerndown being most significant, p = 0.001. This finding appears to be in keeping with the higher anxiety trait scores at Nash, as people with higher scores often tend to be restless and regularly changing from one activity and location to another. It should be borne in mind that the very lack of commercialisation and facilities which may attract such visitors to Nash initially, may also deter a very long stay at this beach, especially in light of the limited refreshment and toilet facilities.

Planned Length of Stay (hours)	Southerndown	Nash	Ogmore	Llantwit
1	-	4	1	1
2	-	8	5	2
3	3	9	12	6
4	19	12	14	21
5	14	10	10	10
6	9	4	3	8
7	1	2	1	-
8 +	3	1	2	1

Table 4.3 Planned Length of Stay at GHC Beaches

There was perceived to be significantly more attractive relief at Nash than at Ogmore ($p = 0.008$), or Llantwit ($p = 0.042$), and also at Southerndown than at Ogmore ($p = 0.018$). There were perceived to be less interesting paths at Ogmore than at all the other three study beaches, and also better views from the paths at Nash and Llantwit than at Ogmore.

Looking at beach facilities, toilets were perceived to be more adequate in number at Llantwit than at Nash ($p = 0.032$), but there were no significant differences in cleanliness of toilets between beaches. Disabled toilet facilities were judged to be best at Ogmore, and worst at Nash. Refreshment facilities were perceived to be better at Llantwit than at the other three beaches. Parking and seating facilities for beach users were also judged to be better at Llantwit. Access, both for disabled and other beach users was judged to be worse at Nash than at the other three beaches.

More wildlife was perceived by clients at Nash, and more plant life at Nash and Southerndown than at the other beaches. In terms of irritation from insect pests, there were significant differences between all four beaches in the ranking order shown in Fig. 4.2.

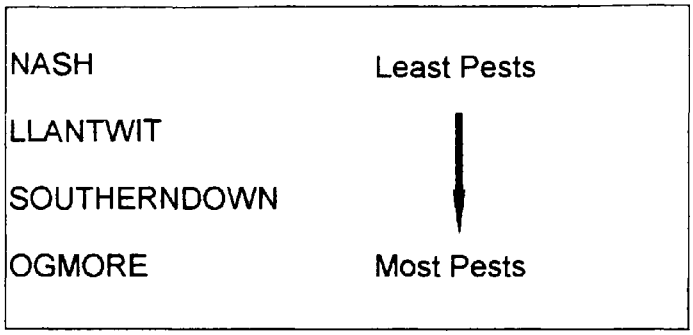


Fig. 4.2 Perception of Insect Pest Irritation at GHC Beaches

Looking at parameters relating to water quality, there were interesting differences between the beaches. Water at Ogmore was perceived to be substantially more polluted (Fig. 4.3), than at the other three beaches. Differences in scores between the other three beaches were not significant (at p = 0.05 level).

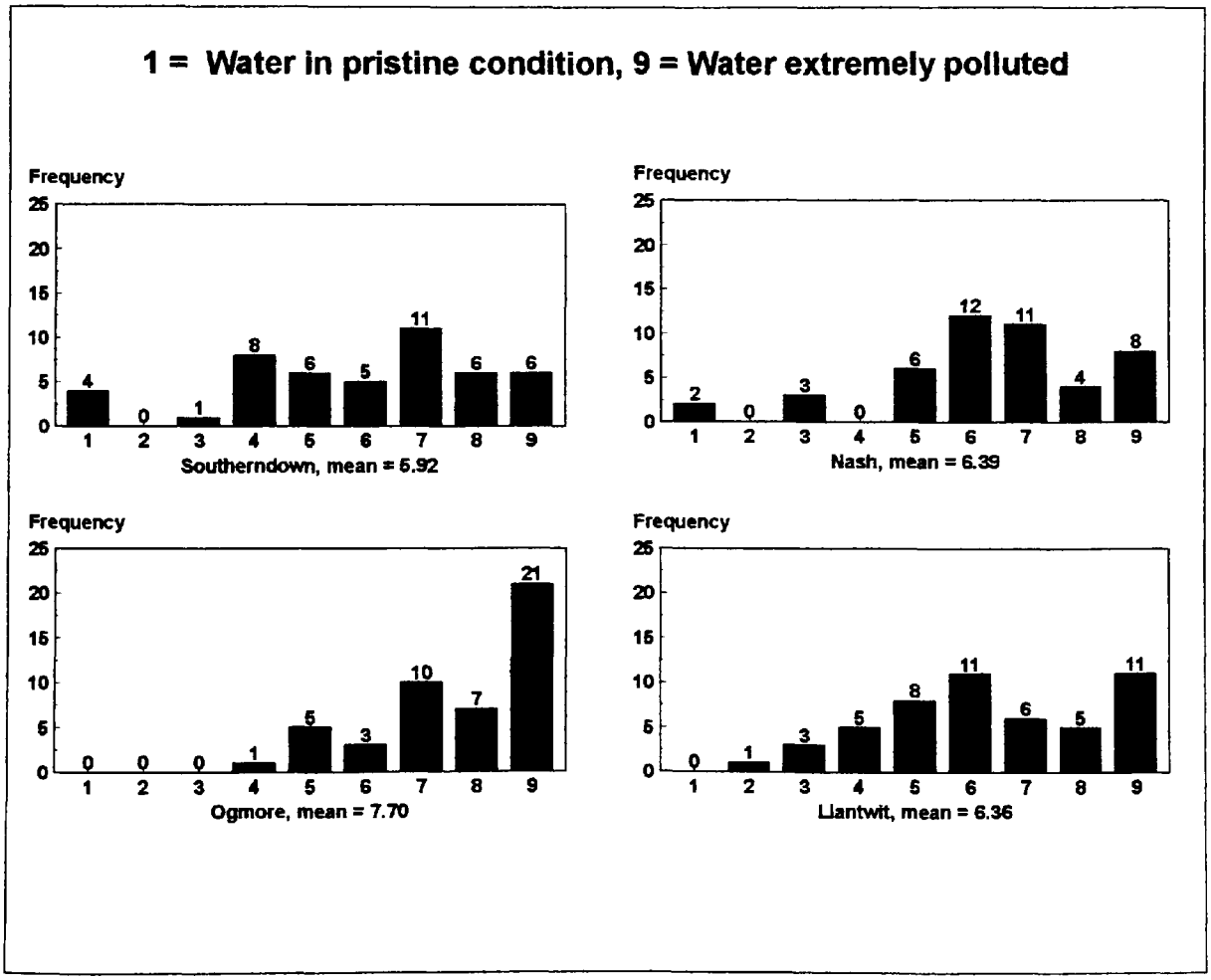


Fig. 4.3 Perceived Water Pollution Levels at the GHC Study Beaches

The water at Southerndown was perceived to be significantly safer, and better for swimming than at the other three beaches. Llantwit was considered to be significantly safer for bathing than Nash and Ogmore. Lifeguard protection was also perceived to be better at Southerndown than at the other three beaches, and worst by far at Nash (which had a mean score of 8.1 compared to 3.0 at Southerndown), where no lifeguard protection was observed. Southerndown was considered to have the safest play areas, with Nash the least safe. Ogmore was perceived to have more litter than the other three beaches (Figs. 4.4 & 4.5), though there were no significant differences in perceived quantities of animal waste between the four beaches. The results suggested a high level of beach user concern about perceived bathing water quality, and levels of pollution and litter at Ogmore.

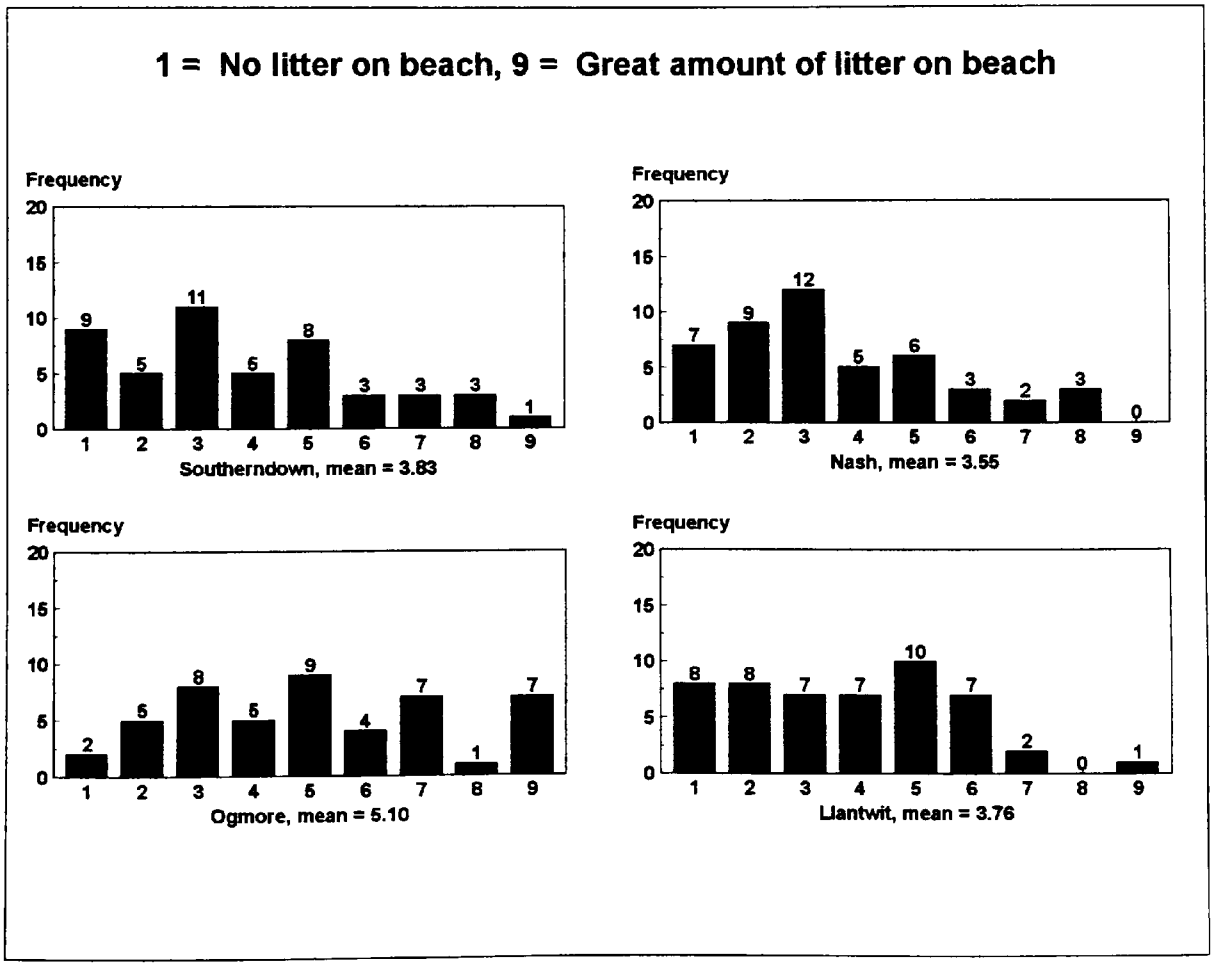


Fig. 4.4 Perceived Beach Litter at the GHC Study Beaches

Given the apparent fact that the beach at Nash is not used for swimming by beach users, it seems entirely appropriate that no lifeguard protection is present at this beach; indeed it might be that provision of such protection would be impractical, and also undesirable if it encouraged beach users to attempt to swim in such dangerous waters. It was not clear from this study why lifeguard protection at Southerndown was considered to be significantly better than at Ogmore and Llantwit. It may be that, as Southerndown is a safer beach at which to swim due to the fact that it is a pocket beach rather than on a linear coast, beach users felt that they were safer at Southerndown and the lifeguards could more easily rescue them if they did get into difficulties.

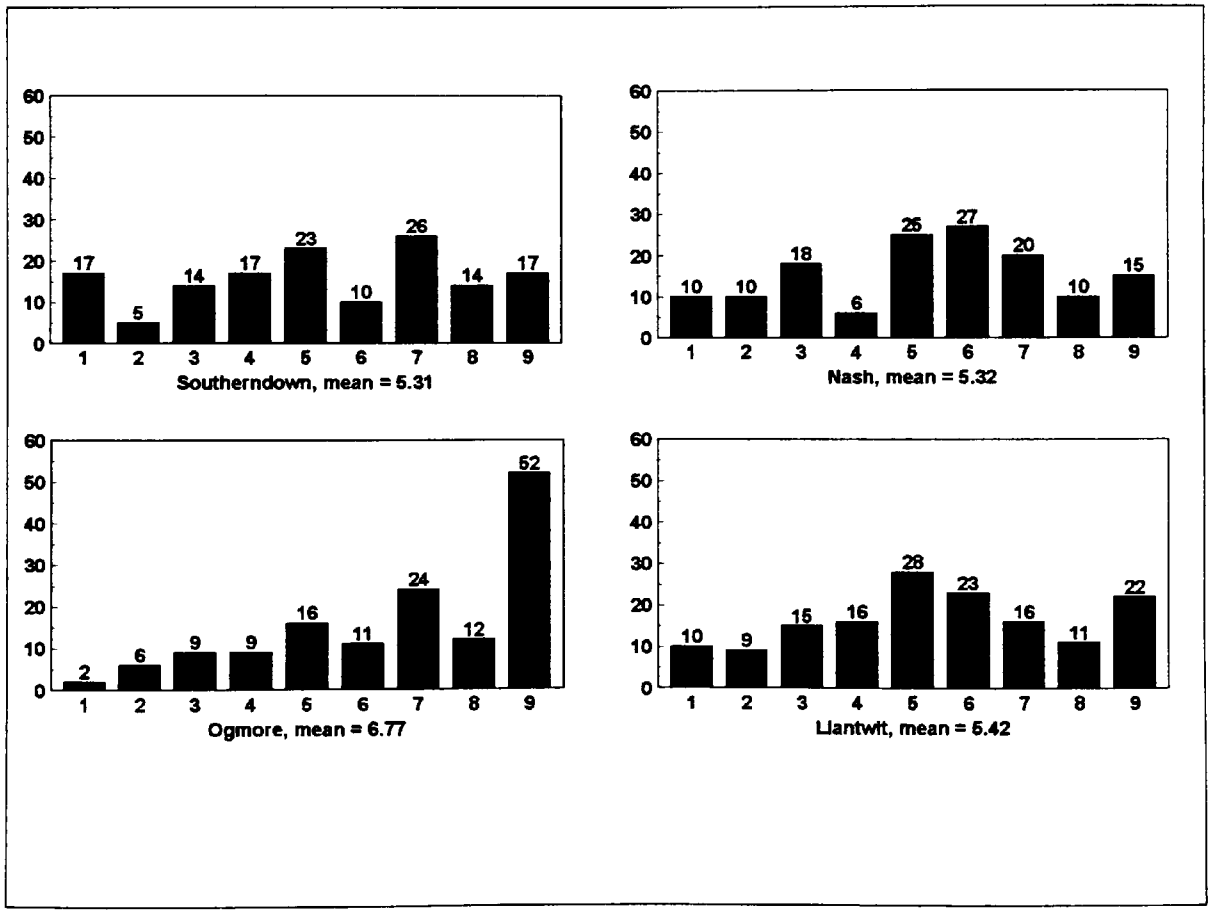


Fig 4.5 Perceived Water Quality and Litter Amount at the GHC Study Beaches

Beach litter was not considered by clients at Nash to be a particularly serious problem in comparison with the other study beaches, although at the time of the survey the remains of a motor car were present in the beach area. The presence and condition of this wreckage might have been considered a hazard to children playing in the beach area which, combined with the presence of unfenced dangerous cliffs, might account for the assessment by visitors that this beach had the least safe playing areas of the those studied.

Finally, in terms of rating each beach in comparison to the best and worst the client had visited, Southerndown and Nash were rated as significantly better than Ogmore and Llantwit, although these comparative ratings of beaches by clients would have been affected by the client's previous experience of other beach environments.

4.6.5 Open Response Questions

Summaries of the responses to these questions are shown in Tables 4.4 to 4.10. In these tables, "S" refers to Southerndown, "N" to Nash, "O" to Ogmore, "L" to Llantwit and "S (C)" to children at Southerndown.

Commercialisation

Responses to the question "*What does commercialisation mean to you?*", 175 out of 224 clients produced one or more specific comments. These were placed into groups of comments and phrases which were considered to be similar or related, as shown in Table 4.4. This produced a total of 316 grouped comments.

Words/phrases	S	N	O	L	S (C)	Total
Too many shops/take-aways/tacky shops	29	18	17	25	9	98
Funfairs/fairgrounds/bingo halls	19	9	9	13	6	56
Noise/radios/ghetto blasters	3	8	3	10	0	24
Litter/dirtyness/smells	2	12	3	2	1	20
Overcrowding/too many people	4	8	2	6	0	20
Commercial exploitation	6	4	4	2	2	18
Spoiling natural beauty	2	6	3	5	0	16
Providing services and facilities	2	1	4	4	3	14
Souvenir/gift shops	5	3	1	2	1	11
Shows	3	4	0	2	1	10
Others	9	10	10	3	1	33
TOTAL	80	83	55	74	24	316
No response/no specific comments	11	11	11	12	4	49

Table 4.4 Responses to the Question "*What does commercialisation mean to you?*"

Thirty-one percent of comments were in the group covering "too many shops or take-aways, tacky shops", and 18% in the group "funfairs, fairgrounds, bingo halls". The other groups of comments were each less than 8% of the total.

Swimming

Responses to the question "*Why?*", following the nine-point scale question "*excellent beach for swimming/appalling beach for swimming*", there were 141 grouped comments and phrases describing why the beach was bad for swimming. These comments and phrases were placed into groups, as shown in Table 4.5. Forty-nine responses (35%), described pollution in one form or another ("filthy beach", "sewage in sea", "dirty water", etc.). Twenty-eight percent of responses referred to shortage of sand at the beach and 23% to dangerous tides or currents. Other grouped responses were less than 6% each.

Words/phrases	S	N	O	L	S (C)	Total	
Pollution/unclean water/sewage	5	10	16	10	8	49	
Lack of sand/rocky shore	0	18	4	14	3	39	
High/dangerous tides	3	3	6	3	1	16	
Strong/dangerous currents	2	5	8	0	1	16	
Sandy/few rocks	3	0	0	0	5	8	*
Plenty of space	1	2	1	0	4	8	*
Poor access	0	3	1	3	0	7	
Good lifeguard protection	6	0	0	1	0	7	*
Clean beach/water	1	0	2	1	3	7	*
Other - why good for swimming	9	1	2	1	1	14	*
Other - why bad for swimming	2	0	9	3	0	14	
TOTAL	32	42	49	36	26	185	

* = Reasons why beach is good for swimming (44 responses, 24% of total)

Table 4.5 Responses to the Question "*excellent beach for swimming/appalling beach for swimming - Why?*".

Lifeguard Protection

There were 63 responses to the question "*Why?*", following the nine-point scale question concerning lifeguard protection ("*excellent lifeguard protection/no lifeguard protection*"). These are shown in Table 4.6.

Words/phrases	S	N	O	L	S (C)	Total
Constant surveillance/lifeguards on duty/competant	16	0	8	5	10	39
No apparent lifeguard protection/inadequate lifeguard protection	0	7	6	3	0	16
Lifeguards remote/have poor views	0	1	1	1	1	4
Presence of warning signs/flags	0	0	1	1	0	2
Lifeguards well-equipped	1	0	0	0	0	1
Lifeguards easy to contact	1	0	0	0	0	1
TOTAL	18	8	16	10	11	63

Table 4.6 Responses to the Question "*excellent lifeguard protection/no lifeguard protection - Why?*".

Responses were placed into 6 groups, with only 2 of these containing more than 4 responses. Thirty-nine responses (62%), mentioned "constant surveillance" or "competent lifeguards on duty", and 16 (25%) including 7 out of 8 responses at Nash, said that lifeguard protection was inadequate or absent.

Best Beach Visited

The question "*What, in your opinion, is the best beach you have ever visited?*", produced a total of 192 responses (Table 4.7). It was noticed that many clients named more than one beach, often one British and one foreign beach. A total of 158 British and 34 foreign beaches were mentioned. Fifty-two responses (27%), mentioned resorts in the Pembrokeshire Coast National Park, 32 (17%), resorts in the Gower Peninsula, and 20 (10.5%), resorts in Cornwall.

A large variety of responses were produced by the question "*Why?*", which followed the above question (Table 4.8), with a total of 543 responses from clients. One hundred and twenty-four responses (23%), mentioned a clean beach and/or sand, and 81 (15%), referred to good bathing water quality. Together these categories accounted for 38% of the total.

Worst Beach Visited

The question "*What, in your opinion, is the worst beach you have ever visited?*", produced a total of 193 responses from 183 clients; 41 clients did not respond (Table 4.9). By far the largest group of responses (39%), mentioned beaches in the Barry area. The beaches of Porthcawl accounted for 27 responses (14%). Of the study beaches, Ogmore was mentioned 14 times, Llantwit 5, and Southerndown 4 times.

Responses to the follow-up question "*Why?*" produced a total of 390 responses (Table 4.10). Eighty-five responses (22%), referred to beach pollution, dirty sand, etc. References to beach pollution, sewage, bathing water pollution and litter together accounted for 212 responses, 54% of the total.

Area/Resort	S	N	O	L	S (C)	Total
Dyfed	8	17	14	10	3	52
Gower	14	4	7	7	0	32
Cornwall	4	2	2	7	5	20
GHC	6	6	1	3	1	17
Devon	2	0	5	1	3	11
S. Coast of England	2	2	2	3	0	9
Channel Isles	0	2	2	1	0	5
E. Coast of England	0	2	2	0	0	4
Isle of Wight	1	0	0	1	0	2
Barry	0	1	0	1	0	2
Scotland	2	0	0	0	0	2
Porthcawl	0	0	0	1	0	1
Kent	0	0	1	0	0	1
Balearics	2	2	0	1	1	6
Greece	0	3	0	2	0	5
USA	2	1	0	0	1	4
Spain (mainland)	2	1	0	0	0	3
Australia	1	0	1	1	0	3
Cyprus	1	1	0	0	0	2
Bulgaria	1	0	0	1	0	2
S. Africa	0	1	0	1	0	2
France	0	1	1	0	0	2
Portugal	1	0	0	0	0	1
Bahamas	0	1	0	0	0	1
Barbados	0	0	1	0	0	1
Canaries	0	0	1	0	0	1
Sri Lanka	0	0	0	1	0	1

Table 4.7 Responses to the Question "*What is the best beach you have ever visited?*".

Words/phrases	S	N	O	L	S (C)	Total
Clean beach/sand	23	27	39	27	8	124
Clean/clear water	18	19	21	13	10	81
Safe/good bathing	5	15	10	9	0	39
Large area of sand	14	11	0	8	3	36
Good facilities	6	5	8	9	4	32
Unspoilt/uncommercialised	9	7	7	3	0	26
Spacious/uncrowded	4	6	4	8	0	22
No litter	6	2	4	3	3	18
Attractive scenery	4	6	4	2	0	16
Soft sand	1	1	3	5	3	13
Quiet/peaceful	2	4	2	5	0	13
Secluded	3	5	3	2	0	13
Wildlife	1	6	2	2	1	12
Walking	0	3	3	2	0	7
Easy access	3	3	1	0	0	7
Other	22	16	9	14	14	75
TOTAL	121	137	123	116	46	543

Table 4.8 Responses to the Question "*What is the best beach you have ever visited - Why?*".

Beach/Resort	S	N	O	L	S (C)	Total
Barry	21	16	19	16	4	76
Porthcawl	5	8	6	6	2	27
Penarth	3	4	3	2	3	15
Ogmore	2	5	7	0	0	14
Lavernock	1	2	0	5	0	8
Weston-super-mare	1	0	4	2	0	7
Llantwit	2	1	0	2	0	5
Robin Hood's Bay, Yorkshire	4	0	0	0	0	4
Southerndown	0	1	1	0	2	4
Other beaches	6	9	6	8	4	33

Table 4.9 Responses to the Question "*What is the worst beach you have ever visited?*".

Words/phrases	S	N	O	L	S (C)	Total
Dirty beach/dirty sand	18	21	22	18	6	85
Polluted/dirty water	11	14	17	13	7	62
Litter/rubbish	13	17	7	8	3	48
Touristy/commercialised	11	4	7	9	0	31
Crowded/too many people	6	12	2	8	0	30
Insufficient sand/beach rocky or pebbly	6	3	6	2	1	18
Sewage present	4	5	1	6	1	17
Noise	3	6	2	4	0	15
Smells/bad odours	6	0	2	2	2	12
Animal waste	1	2	3	3	3	12
Mud/sludge/silt	1	1	4	2	3	11
Flies	0	2	4	0	1	7
Poor access/isolated	5	0	2	0	0	7
Dangerous beach area or bathing	3	1	1	1	1	7
Dogs present	1	1	3	0	1	6
Distant or poor facilities (including toilets)	2	0	4	0	0	6
Sea too far out/large tidal range	0	1	2	2	0	5
Seaweed present	2	2	0	0	0	4
Other	3	4	0	2	0	9

Table 4.10 Responses to the Question "*What is the worst beach you have ever visited - Why?*".

4.7 Perceptions of Users at Individual Beaches

4.7.1 Llantwit

Refreshment facilities at Llantwit appeared to be well appreciated by clients, with a mean score of 4.2 on the nine-point scale (c.f. mean of 7.1 at Ogmore), and car parking and seating facilities were also well regarded. In spite of the presence of these facilities close to the seafront, it appeared that people generally did not feel that the beach area was too commercialised (mean score of 5.7 compared to an "optimum" of 5), and litter was not perceived to be a great

problem. This suggests that beach users at Llantwit appreciated the level of facilities provided at the beach, and did not feel that they intruded too much into the enjoyment of the beach environment. It seemed that the level of commercialisation present at this beach was appropriate to the expectations and desires of its clientele, and may also indicate that a moderate level of commercial facilities can be provided at a beach without excessively detracting from or degrading its natural quality, if such development is done sensitively. In this regard, it was considered that GHC management should consider publicising its activities and management philosophies at this beach to a greater extent, in order to communicate to beach users the role which the Heritage Coast scheme has played in controlling and modifying development at this beach. This might lead to an increase in the proportion of visitors aware of the Heritage Coast scheme at this beach, and a greater appreciation among them of its importance in coastal management. However, this might conflict with the current low-key HC ethos.

Clients at Llantwit also showed a high level of appreciation of the walks available along footpaths in the beach area and the views from them, suggesting that a large proportion of beach users had an interest in this activity. This is despite the fact that the relief at Llantwit was not regarded by clients as being as attractive as that at Nash. This raises the question of what it is in a view from a beach or sea cliff that people find attractive; is it merely rugged scenery, which people may be attracted to on account of its relative relief, or are the details of the view more important? Appleton (1976), considered that coastal landscapes can be either a combination of the effects of economic activity (such as fields, farms or buildings), or purely the result of natural forces; while industrial premises, pylons, urbanisation, etc, can be considered as detracting from landscape quality. Also a particular vantage point may make a particular landscape more pleasing; a flat 'landscape' (such as the surface of the sea), may seem uninteresting from a low vantage point but more striking and pleasing from a high one such as a sea cliff. In this context, we might expect views from (and perhaps also of), the high cliffs at Nash, Southerndown and to a lesser extent Llantwit to be appreciated more than those from the low-lying sea-front at Ogmore.

Scores for psychoticism at Llantwit were higher than those at the other study beaches (mean = 3.9), but a two-sample t-test (two tailed), showed that the mean score was not significantly different from that of the large sample examined by Eysenck & Eysenck (1975). It can be concluded that beach users at Llantwit do not have significantly higher scores for psychoticism than the general population (as examined by Eysenck & Eysenck, 1975). Williams & Sothern (1986), gave a breakdown of the socio-economic grouping of 125 visitors to Llantwit, 91 of whom fell into groups I to V. Their breakdown showed a similar distribution of visitors across the socio-economic groups to that found in this study (Table 4.2), although only 26 out of 50 respondents in this study were actually in employment.

One surprisingly large difference found in this study compared to that of Williams & Sothern (1986), was in the average length of stay of visitors at the beach. At Llantwit, Williams & Sothern (1986), found that 70% of visitors stayed for less than 2 hours, whereas in this study only 3 out of 49 clients responding said that they planned to stay for 2 hours or less (Table 4.3). Forty out of 49 clients in this study said that they planned a stay of more than 3 hours, compared to less than 20% in the survey of Williams & Sothern (1986). It may be that the improvement of facilities at this site played a part in encouraging people to stay longer, and again it must be borne in mind that Williams & Sothern (1986) conducted their survey over a whole week (i.e. including a weekend). Even so, the size of the difference in planned length of stay between the two studies was surprising. Possibly, changes in employment patterns in the area have resulted in people having more leisure time available to spend at the beach.

4.7.2 Southerndown

In many respects the mean values for beach parameters obtained at Southerndown were similar to those for the average of the whole client base across the 4 beaches. Mean values for parameters concerning facilities, walks, views, car parking and refreshments could be described in this way, with the

beach being perceived as neither particularly good nor bad compared to the other study beaches. The fact that refreshment facilities were not judged to be particularly good (a mean score of 6.4 compared to 4.2 at Llantwit), reflects the limited facilities available at this beach, but this does not seem to deter visitors from planning a long stay.

The survey of Williams & Sothern (1986), also covered Southerndown. They found that a high proportion of visitors (59%), stayed for less than 2 hours, while in this study no client said that they planned to stay for less than 2 hours (Table 4.3). Thirty-two out of the 50 clients surveyed at Southerndown were in employment, with all but 3 in socio-economic groups II, III and IV (Table 4.2). This contrasts with the findings of Williams & Sothern (1986), who found that 21 out of 106 employed persons could be classified into socio-economic group I. Notwithstanding the differences in time of survey described earlier, this discrepancy is difficult to explain, except perhaps in terms of changes in employment patterns. Williams & Sothern (1986), also found that almost 88% of visitors to Southerndown were from either Mid or South Glamorgan. This pattern was not contradicted in this survey as only 5 out of 49 clients said that they had travelled more than 25 miles to the beach.

At Southerndown, mean scores for the personality parameters of extroversion and anxiety trait were significantly different from those at Nash, with higher and lower scores respectively. Eysenck & Eysenck (1975), described a typical extrovert as sociable, carefree and easy-going, while a low anxiety trait score indicates a low level of anxiety proneness. These results might be expected from visitors to this beach during a busy day during the summer, where visitor numbers and density are high, relative to a beach such as Nash.

It was found that both adults and children at Southerndown perceived a great deal of irritation from insect pests (mean scores of 7.9 and 8.3 respectively). These were tentatively identified as mainly wasp-mimicking hover-flies. These insects were found to be even more of a problem at Ogmore (Chapter 4.7.3).

4.7.3 Ogmore

Not surprisingly, in view of the generally low relief of the beach area at Ogmore, relief was considered to be a less attractive feature of the beach at Ogmore than at the other study beaches. Paths and the views from them were also considered to be less interesting, again probably due to the lack of relative relief and high vantage points at this beach. As with Southerndown, values for many beach parameters were unremarkable, but refreshment facilities were poorly regarded (mean score 7.1). At Ogmore, refreshments are provided by mobile vendors situated in the car park immediately behind the beach area, and sell a limited range of products, typically ice-creams, hamburgers, teas, soft drinks, etc. As with Nash, this may be a factor in limiting the average length of time beach users planned to remain at this beach which, at 4.0 hours was almost an hour less than at Southerndown (Table 4.3).

Perceived water quality at Ogmore was markedly worse than at the other study beaches, and levels of litter were also considered to be higher (Figs. 4.3 & 4.4). The subject of water quality is one of the few parameters in this study where perceptions of beach users (at least at 3 of the 4 study beaches), can be objectively compared to the actual situation existing at the time of the survey.

As discussed in Chapter 4.7.2, wasp-mimicking hover-flies (together with winged ants), caused great irritation to beach users at the time of this study; only 1 client scored less than the maximum of 9 for the parameter "pests" ("no irritation from pests (flies)/great irritation from pests (flies ,etc)"). Winged ants were found to be particularly abundant in the vicinity of the mouth of the River Ogmore and the adjacent car park. Large numbers of these insects were observed settling on vehicles. Hover-flies were abundant on all areas of the beach visited, and frequently landed on clothing, exposed skin and food, causing considerable inconvenience to beach users. Although, there is no evidence to suggest that such large outbreaks are frequent, it is possible that they were associated with the

large amount of litter present on the western (right) bank of the River Ogmore's mouth adjacent to the Merthyr Mawr dune system.

4.7.4 Nash

Access to the beach area was considered to be worse at Nash than at any of the other beaches, both in general (with only 3 out of 47 respondents scoring less than 5 on the nine-point scale), and for disabled persons. It might be expected that visitors would experience difficulty trying to negotiate the steep, eroded and often muddy path which leads from the cliff-top car park down to the beach area. Although no survey was undertaken of the size and composition of groups of visitors, it might be expected that this difficulty would discourage family groups containing small children and/or elderly persons from visiting this beach. It may be that, partly as a result of this, Nash tends to attract people who do not bring small children with them. Conversely, it is groups of visitors with children who tend to stay at the beach for longer periods of time, making a whole "day-out" of the beach visit.

Visitors to Nash showed a high appreciation of the quality of landscape and views at the beach. Views inland from the cliffs at Nash might be considered to have fewer "detractors" than those at the other beaches, since few houses or other signs of human influence other than agriculture can be seen. Laurie (1975), considered that a person's response to a landscape was highly variable, being affected by a variety of factors including imagination, ability to contemplate, education, environmental experience and mood. It may be that beach users with differing levels of appreciation of landscape and beach aesthetics, may be attracted to different beaches, and experience seashore scenery in different ways.

The personality parameters measured during the survey indicated that Nash users were also more likely to have lower scores for extroversion, and higher scores for corrected anxiety trait, than those at other beaches (although it should be noted that the only statistically significant differences at the $p < 0.05$ level, in

mean scores for these parameters were between Nash and Southerndown). From these results it can be suggested that beach users at Nash were more introverted than those at the other study beaches. Eysenck & Eysenck's (1975) description of the introverted personality type (quiet, reserved shy, non-participative), seems to accord with the profile of the users of the beach environment at Nash, where the density of beach users tended to be low compared to the other study beaches, and noise levels both from other users and commercial activities tended to be negligible. The characteristics associated with high anxiety trait score might also account for the apparent preferential selection by such people, of Nash beach with its low level of commercialisation and low user density.

4.8 Perceptions Regarding Water Quality and Litter

There were striking correlations between several selected parameters which were considered to be important in judging whether the beaches were suitable for swimming. There were positive correlations, all with $p = 0.000$, between parameters describing cleanliness of water, freedom from water pollution and perceived quality of the beach for swimming. There were also positive correlations of $p = 0.000$ between parameters concerning water safety, safety of playing areas, lifeguard protection and quality for swimming; i.e. correlations of $p = 0.000$ for all paired combinations of these four parameters. Results indicated that beach users perceived a close link between water quality in terms of cleanliness and absence of pollution, and suitability of that beach for swimming. Also, a client judging a beach to be good for swimming was also likely to judge the beach to be higher in quality compared to others that he/she had visited ($p = 0.000$).

Of the study beaches, Southerndown was at the time of this study the only one identified by the U.K. Government as falling within the scope of the EC Bathing Waters Directive (76/100/EEC; NRA, 1991). A summary of results for Southerndown for the 1991 bathing season (defined for the purposes of the Directive as 15th May to 30th September), is given in Appendix 3. Llantwit and Ogmore were included in the list of non-identified bathing waters produced by the

NRA. During 1991 monitoring of such beaches was carried out whenever resources allowed, at fortnightly intervals (NRA, 1991; Appendix 4).

At the time of the beach surveys (1991 to 1995), the Government used the E. coli and total coliform "I" (i.e. mandatory), standards as the basis for determining U.K. compliance with the Directive. Additional microbiological "I" standards concerned the occurrence of Salmonella and enteroviruses. Occurrence of faecal Streptococci was also examined; however this had no mandatory standard in the Directive, but merely a "G" (guideline) value. The relevant "I" and "G" levels for total coliforms, faecal coliforms and faecal Streptococci are given in Table 2.1. The existing mandatory levels for faecal and total coliforms set by Directive 76/160/EEC (CEC, 1976), were not strict by comparison with some US and Canadian standards (Brown *et al.*, 1987; Wheeler, 1990). The NRA's Welsh region was granted a derogation for transparency, at all bathing waters from 1991; at Southerndown in 1990 there were 14 failures out of 22 samples assessed for this parameter. This derogation was granted because of natural water turbidity along many parts of the Welsh coast.

Results showed that in 1991, 45 out of the 51 identified bathing waters covered by the NRA's Welsh region (including 1 geographically in England), complied with the E. coli and total coliform "I" standards specified in the Directive. Southerndown had no failures in samples for E. coli and total coliforms, had no positive tests for Salmonella (from 5 samples), or enterovirus (2 samples). Southerndown did however, have 6 samples out of 22 with more than 100 faecal Streptococci per 100 ml; other identified bathing beaches in the South Wales area had between 2 and 18 samples of greater than this level.

For the non-identified bathing waters of the study beaches of Llantwit and Ogmore, results in 1991 showed that Llantwit exceeded the "I" standards for E. coli 3 times, and total coliforms once in 27 samples for each beach. The guideline value for faecal Streptococci was exceeded 9 times in 27 samples. At Ogmore, there were 2 failures (to meet the "I" standard), each for E. coli and total coliforms

from 22 samples, and the guideline value for faecal Streptococci was exceeded 7 times in 22 samples. These results mean that both Ogmore and Llantwit would have failed to comply with the standards of 76/100/EEC, if they had been identified as bathing waters in 1991.

At Ogmore, it may be that, as suggested by Smith *et al.*, (1991), inputs other than the client's own observations were swaying opinions, such as hearsay and memory of what water quality had been like at the beach in the past. It may be that the nearby sewage treatment works led some clients to conclude that the water must be polluted. A similar explanation was suggested by Smith *et al.*, (1991), for observations relating to urban and rural lakes in New Zealand. The Pen-y-bont sewage treatment works situated adjacent to the River Ogmore, discharges sewage receiving full biological treatment. According to the NRA, complaints were received from time to time concerning discharge of debris, but their opinion was that most of the debris at the Ogmore river mouth and beach area was washed in on the tide, and was a general litter problem. Studies by Simmons & Williams (1992) have suggested that riverine sewage via combined sewer overflows make a large contribution to sewage related debris on the GHC coast.

Of beaches and resorts mentioned in responses to the question "*What is the worst beach you have ever visited?*", beaches at Barry and Porthcawl featured prominently (see Table 4.9). Three beaches at each of these resorts were at the time of the study, identified as bathing beaches for the purposes of the EC Bathing Waters Directive (76/100/EEC); Jackson's Bay, Whitmore Bay and Cold Knap Beach (at Barry), and Trecco, Sandy and Rest Bays (at Porthcawl). In 1990, all 3 beaches at Barry, and Sandy Bay at Porthcawl failed to comply with the standards laid down by the Directive, but in 1991 all except Jackson's Bay complied. However, compliance is considered an unreliable indication of trends at individual beaches due to statistical limitations of the data set (NRA, 1991).

The above discussion suggests that beach users have some justification in expressing dissatisfaction with water quality at beaches in the vicinity of Barry, and perhaps to a lesser extent, those at Porthcawl, Llantwit and Ogmore. However, it is doubtful if a large proportion of beach users questioned in this study were aware of the results of the analyses performed by the NRA, so we may still ask how the beach user builds up his/her opinion of water quality and pollution levels, and what influences this.

A few workers have previously examined public perceptions in relation to water quality evaluation at bathing beaches, and also in lakes and rivers, and have considered whether water quality perception by users can supplement objective water quality measures (David, 1971; Nicholson & Mace 1975; Dinius 1981; Smith *et al.,* 1991). According to Smith *et al.,* (1991), research into the perception of water quality has tended to support the view that the public use many factors when forming opinions about water quality, but that visual factors predominate. Also, aesthetic appearance of water has been shown to have an effect on levels of self-reported illness following bathing (Phillip, 1990).

Dinius (1981), found that increases in water discolouration and litter quantity were viewed as increases in the level of pollution. Also, laymen not only evaluated visually polluted sites lower for leisure activities, but also evaluated the actual water quality as lower. Such an association of litter with water quality may help to explain why in this study, Ogmore (which was perceived to have more litter in the beach area than the other study beaches), was perceived to have the poorest water quality. As a result of this relationship, Dinius (1981), has argued that if a water site (such as a bathing beach), is kept free of litter, less concern may be expressed about water with a marginal quality. This suggests that the appropriate authorities should take action to attempt to keep the beach areas (and Ogmore in particular among the study beaches), as free as possible of litter in order to improve perceived water quality. The Marine Conservation Society (1990), have identified the problem of debris on beaches as a widespread problem detrimental to the recreational use of the coast. Also, Dinius (1981), commented

that if expenditure made to control water quality does not include efforts to keep recreational sites clean, people might not perceive the benefits from this expenditure. Litter clearance has also been identified as a problem in need of attention on Heritage Coast beaches by the Countryside Commission (1991).

Beach litter can be classified as having either a land or ocean source. Major contributors to the latter are merchant ships, cruise ships, commercial fishing and recreational vessels (Williams & Simmons, 1995a). Debris can also be blown, washed or discharged into water from land, some of the sources being recreational beach users, combined sewer outfalls and fly-tipping. Many of these can enter the marine environment via rivers (Williams & Simmons, 1995a). From the above possible sources of beach litter, the most important at a particular beach will vary with location; e.g. Scott (1972), showed that tourism made a very small contribution to persistent marine debris (PMD) at remote stretches of shoreline in northern Scotland. Typical composition of litter found on beaches bordering the Bristol Channel however, is disparate from that of many UK/Irish Sea beaches (Williams & Simmons, in press). The principal source of this litter is postulated as riverine, from sewage debris from combined sewer overflows (CSO's) and fly-tipping sites. Litter from marine sources and beach users formed only small proportions of that surveyed at Merthyr Mawr on the GHC (Williams & Simmons, in press).

Sewage related debris is mainly composed of female hygiene products, condoms and nappies which are frequently disposed of via the sewage system. Panty liner backing strips have been highlighted as a serious problem (Simmons & Williams, 1994), as the type of plastic used does not appear to undergo full degradation but can exist in a fragmented form for an indefinite period. These items are also highly mobile and frequently traverse river systems to be deposited on beaches. Photodegradation has been postulated as a major decay mechanism, but samples can retain 80-90% of their tensile strength after 4 months exposure to the beach environment (Williams & Simmons, 1996). The dominance of sanitary towels as the most numerous CSO discharge component highlights the

need to address this source (Williams & Simmons, 1995a). CSO's form an integral part of most UK sewer systems (over 3000 in Wales alone), with the majority unscreened (Williams & Simmons, 1995a). Alternative means of female sanitary material disposal have been promoted by Surfers Against Sewage (SAS) and the Women's Environmental Network (WEN), with their "bag it and bin it" campaigns.

David (1971), found that the public, when asked to describe "pollution" (in the context of lakes and rivers), often mentioned algae and murky, dark water, but did not often mention attributes such as "chemicals or disease germs that are not detected by the human sensory system". On a similar theme, Nicholson & Mace (1975), found that in a survey less than 10% of people mentioned non-visual aspects of water pollution. However, with recent publicity concerning (mainly), non-visual aspects of water pollution such as sewage and chemical pollution in relation to bathing beaches, it could be argued that the situation may have changed somewhat since these studies were carried out, and that in any case they might well not apply to beach users in this country (the work of both David (1971), and Nicholson & Mace (1975), was carried out in the U.S.A.). So it may be that the opinions of beach users in the Glamorgan Heritage Coast area are not purely influenced by visual aspects of water pollution.

Regarding water clarity, it may be noted that all bathing waters in the Glamorgan Heritage Coast area are inevitably rendered somewhat non-transparent, by fine sediment retained in suspension by the strong currents in the Severn Estuary/Bristol Channel area (hence the derogation applying at Southerndown to the transparency criterion of the EC Bathing Waters Directive). In relation to this it is noteworthy that 54% of clients, when asked to name the best beach they had ever visited, named beaches in Dyfed, the Gower A.O.N.B. or Cornwall (Table 4.7), where water clarity is often superior to that observed on the Glamorgan Heritage Coast beaches. However, only 15% of responses to the follow-up question "Why?", relating to the above question, mentioned "good, clean or clear" water. A clear association between water clarity and perception of beach

quality cannot be said to have been demonstrated in this study and more work on this aspect of beach/bathing water quality perception is needed.

No data is available concerning water quality at Nash, but here, as was generally the case with the other study beaches, there was a close association between perceived water quality and perceived suitability of the beach for swimming, and also overall beach quality. This is perhaps surprising in the case of Nash, where the rocky sea bottom and shore, and extremely strong currents of up to 27 knots make this beach highly unsuitable for bathing. It is noteworthy that while 11 out of 51 clients marked "5" or less on the nine-point scale for the question relating to the quality of the beach for swimming (i.e. nearer the "*excellent for swimming*" end of the scale), no beach users were observed to be actually swimming in the sea by the writer on any visit conducted in connection with this study (Williams, *pers. comm.*, confirmed this point). This may suggest that there is not necessarily a close link in the minds of beach users between assessing a beach as suitable for swimming from the point of view of water quality, and an actual intention to swim at that beach, after other factors such as safety have been more carefully considered. The close correlation observed between perceived suitability of a beach for bathing and the assessment of overall beach quality, suggests that beach users do link their immediately perceived (potentially rather than carefully considered), assessment of the quality of a beach for swimming with their assessment of the overall quality of the beach.

Lant & Mullens (1991), considered that water quality was an inappropriate scale to measure the recreational value of lakes and rivers, and Smith *et al.*, (1991), stated that surroundings must also play a key part in overall site perception. It is not clear whether or not these views were supported by the results of this pilot study, but it could be argued that, although the water at Nash is actually unsuitable for swimming, the absence of obvious sources of pollution combined with the rugged scenery and dramatic relief of the sea cliffs may have resulted in an increase in the overall rating of the beach by the clients. At Ogmore on the other hand, the proximity of the Pen-y-bont sewage treatment works, the

unexciting beach scenery (and possibly also recollection of previously poor water quality), may have combined to produce a lower overall evaluation of the quality of this beach. At Southerndown, there is no obvious source of pollution such as a sewage treatment works or outfall present, and the morphology of the beach in being set in a bay means that dangerous longshore currents are greatly reduced. In the light of these considerations it is appropriate that Southerndown was perceived to be significantly safer and better for swimming than the other 3 study beaches.

The discussion above suggests that where an obvious potential (or perceived), source of pollution is present in the vicinity of a beach, the appropriate authorities should make every effort to reassure visitors that the water quality is appropriate for bathing. At present, only Southerndown of the study beaches has an information board giving an indication of water quality at the beach, as required at an identified bathing beach. Provision of such information boards could also be considered at Ogmore and Llantwit, where appropriate sampling and analysis of water samples were taking place, even though these beaches would not have complied with the EC Bathing Water Directive at the time that this study took place.

It was found that clients in higher socio-economic groups appeared to perceive lower levels of water quality at the study beaches, possibly reflecting a greater awareness of, and concern about, environmental problems such as water and beach pollution. In this context, David (1971), suggested that expectations about an "appropriate" or "traditional" level of pollution might be an important factor in influencing a person's perception of pollution. These findings lend weight to the opinion of the Countryside Commission (1991), document, which contended that all intensively used beaches on Heritage Coasts should be designated as "bathing beaches" with the intention of complying with the EC Bathing Waters Directive. Such a designation might help to reassure beach users that water quality at all such beaches was satisfactory. Also, female clients appeared to be more likely than males to perceive water quality as a problem in this study. A

similar finding was reported by David (1971), who expressed the opinion that since many mothers take their young children swimming, they are more likely to be concerned about water quality than fathers or non-parents.

4.9 Effect of Personality and Socio-Demographic Factors on Beach Perception and Selection

4.9.1 Results

There was a significant negative correlation ($p = 0.000$), between age and extroversion, showing that younger clients tended to be more extroverted than older clients. There were no significant correlations ($p < 0.05$), between the age of beach users and other personality parameters. Extroverted clients tended to plan a longer stay at the beach ($p = 0.000$). Those clients with scores for extroversion greater than 14 (the median value), planned to stay for a mean of 4.7 hours, compared to a mean of 3.8 hours for those with a score of 14 or less.

There was found to be no significant correlation ($p < 0.05$), between occupation (i.e. socio-economic group) of employed persons and the personality parameters of extroversion, psychoticism, neuroticism, anxiety state and trait. There was found to be no significant difference in anxiety state and trait scores between male and female clients.

Significant differences were found regarding opinions and perception of beach aesthetics and facilities, according to the individual client variables of gender, neuroticism, extroversion, anxiety, planned length of stay, distance travelled, socio-economic status and age. All statistical testing described below regarding these aspects, relates to t-tests unless otherwise stated.

Gender

Male beach users considered bathing water quality to be better (water cleanliness, $p = 0.001$; water pollution, $p = 0.02$), encountered less pest irritation

($p = 0.01$) and considered coastal views to be more attractive ($p = 0.04$). Females perceived more animal waste in the beach area ($p = 0.02$), and considered beach odours to be less pleasant ($p = 0.02$). This suggests that males are less concerned with cleanliness than females. Pest irritation, except insofar as pest abundance is influenced by local environmental factors such as marine debris, etc, is generally outside the control of the beach manager. Beach water quality is a function of input of untreated/partially treated sewage effluent into the marine environment, storm water discharge and local water current patterns. The correlation between perceived water quality and overall beach rating (Kendall's Tau C, $p = 0.033$), suggested the importance of water cleanliness (or perceived water quality based on water cleanliness), in beach aesthetic perception.

The finding that female beach users perceived coastal views to be less attractive may suggest that females are more aesthetically aware than males. Current beach management policies do not distinguish between gender, but this research shows there is a marked difference in beach perception according to gender.

Extroversion

Differences were observed between extroverts and introverts with regard to beach selection and perception of beach aesthetics and facilities. Extroverted visitors considered refreshment facilities to be better ($p = 0.03$). They considered bathing waters to be safer ($p = 0.03$), better protected by lifeguards ($p = 0.03$), but actually rated the beach less highly than beaches previously visited ($p = 0.03$).

As mentioned in Chapter 4.7.4, visitors to Nash beach were more likely to be introverted than those at other study beaches. This preferential selection would accord with the low beach user density found at Nash. In keeping with the low-key cultural environment, management at Nash has not endeavoured to further develop this beach.

Anxiety/Neuroticism

Several psychologists (e.g. Spielberger *et al.*, 1970) have argued that anxiety is a more useful dimension than neuroticism with regard to effect on people's behaviour. Anxiety trait would be expected to determine initial choice of beach. Anxiety state might be influenced by perception of the situation in a particular beach environment, and be less relevant to pre-journey beach selection. For the purposes of examining the effect of personality and socio-demographic factors on beach perception and selection, the parameters of anxiety trait and neuroticism were treated as a single variable.

Those beach users with high anxiety state scores found beach relief more attractive ($p = 0.004$). Nash visitors had higher anxiety trait scores ($p = 0.01$) compared to Southerndown. Such people would tend to avoid situations (such as a crowded beach), which might lead to feelings of tension or apprehension; hence their preferential selection of Nash beach which has a low beach user density. Visitors with higher scores for neuroticism considered the number of toilets to be less adequate ($p = 0.03$). Such people were more concerned about being able to find toilet facilities. "Honeypots" by definition must have refreshment and toilet facilities, and their very nature implies that they are more attractive to this type of individual.

Length of Stay

A breakdown of planned length of stay of beach users was shown in Table 4.3. Visitors to Nash tended on average to plan a shorter stay at the beach ($p = 0.001$), compared to visitors at Southerndown. Average stay length was 3.8 hours compared to 4.9 hours at Southerndown. Beach managers should be cognisant of stay length because this brings into question factors such as toilet facilities, refreshments, etc.

Distance Travelled

People who had travelled furthest to the beaches considered car parking to be poorer ($p = 0.004$). Those who had already spent considerable time/distance

travelling to the resort (14.3% had travelled 48 km or more) might be expected to feel annoyed at further delay due to parking difficulties. Those who had travelled furthest considered toilets to be cleanest ($p = 0.004$) and the beach cleanest ($p = 0.03$). This suggests these visitors will tolerate poorer quality facilities and other shortcomings at the destination.

Socio-Economic Status (SES)

Visitors of higher SES were more concerned about shortage of toilets ($p = 0.02$) and seating facilities ($p = 0.02$). These visitors perceived water quality to be poorer than visitors of low SES (water pollution, $p = 0.02$; water cleanliness, $p = 0.07$), suggesting a greater concern about water pollution. It could be that visitors of high SES are more critical of inadequacies in facilities in general. There is little literature relating to research on beach user SES but beach managers should bear this parameter in mind when considering future planning policies.

Age

Nash tended to attract on average, slightly older visitors (mean age = 42 years at Nash compared to 35 years at Southerndown), than the other 3 study beaches ($p = 0.010$). Older visitors considered seating facilities to be less adequate than did younger visitors ($p = 0.03$).

4.9.2 Discriminant Function Analysis of Variables Influencing Beach Selection

Taking into account the implied importance of personality variables in influencing choice and acknowledging the influence of socio-demographic factors discussed above, it was initially postulated that the seven factors above could influence beach selection ("Model 1", Fig. 4.6). To test whether the variables described above influenced beach selection by visitors to the GHC, the technique of Discriminant Function Analysis (DFA) was used. DFA is a statistical procedure carried out on variables which contain mutually exclusive categories. Analysis isolates the variables which can theoretically be used to determine which category

of the discriminant variable any specific case will fall into. These other variables (in this case the 7 variables in Fig. 4.6), are called predictor variables. Using DFA, one should be able to predict with a relatively high degree of certainty which category of the discriminant variable (i.e. which beach) any specific case will fall into, by virtue of the values of the predictor variables.

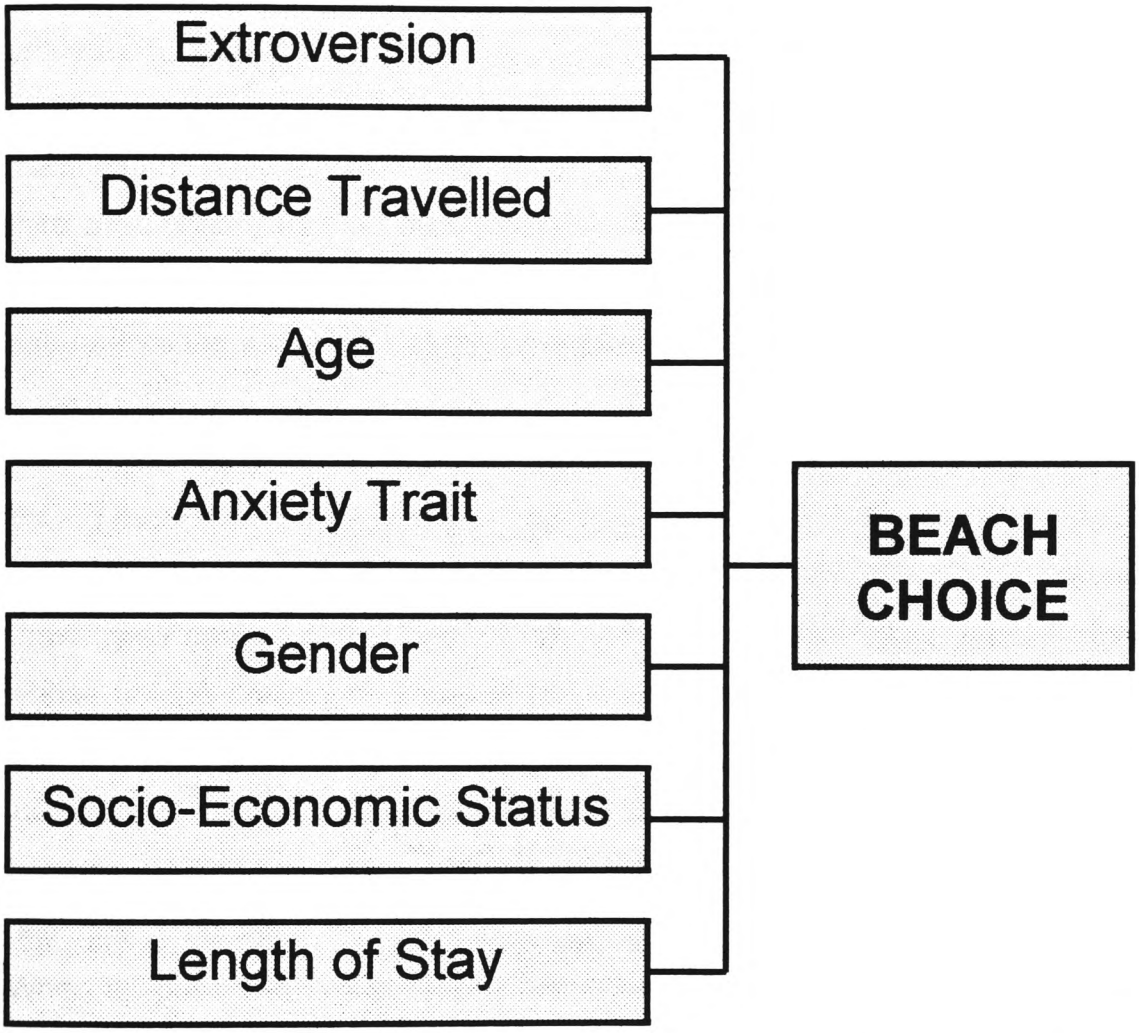


Fig. 4.6 Hypothesised Model of Psychological Factors Affecting Beach Choice (Model One)

For the purpose of this DFA it was assumed that:

a) each group identified by DFA was a sample from a multivariate normal population.

b) the population co-variance matrices were equal.

c) discriminating variables were not linear combinations of any other variables.

With regard to the first of these assumptions, it is possible to check for normality of distribution by examining each of the variables individually. The equality of the population co-variance matrices (required to assure validity of the procedure), was tested using the statistic Box's M. In this case, a Box's M of 24.922 (significance = 0.277), demonstrated equality of the group co-variance matrices and allowed confidence to be placed in the results of the procedure. The third assumption, that no discriminating variable may be a linear combination of any other discriminating variable, was tested by examining correlation values before entering variables into the DFA process.

It is not usual to use DFA as a "trawling" technique and only variables having theoretical substance should be included in the analysis. However, in this case as a result of the theoretical near-vacuum existing in this field, an exploratory "trawl" was carried out. Unnecessary variables (those that correlated highly, but whose unique contribution was small), were identified and eliminated by using a stepwise procedure for the DFA. The selection criterion chosen for stepwise inclusion of discriminating variables in this DFA was the reduction of Wilk's Lambda. Wilk's Lambda is a discriminant statistic which is used to determine the relationship between the discriminant grouping variable and the predictor variable. When all observed group means are equal, a Lambda of 1 is attained. Values approaching zero occur when the within-groups variability is small compared to the total variability, i.e. most of the total variability is attributable to differences between the means of the groups. Therefore, the lower the Wilk's Lambda for a predictor variable, the better that variable will be as a predictor for that discriminant group (in this case, a better predictor of beach choice). The discriminant function scores are shown in Table 4.11.

The significance of the lambda obtained was tested by conversion to an approximate Chi-square statistic. The significance level of 0.003 indicated that the results came from a population which did have significant differences between the groups. The percentage of cases classified correctly is the final indicator of the effectiveness of the discriminant function. In this analysis 86% of cases were correctly classified in terms of group membership (i.e. beach selection). Thirteen percent of the total variance within the data was explained by the 4 variables identified by the DFA.

Variable	Wilks' Lambda	Equivalent F	Degrees of Freedom	p
Anxiety Trait	0.7	2.41	3, 4, 76, 196	0.01
Gender	0.76	2.81	2, 4, 76, 150	0.01
S.E. Status	0.84	3.69	1, 4, 76	0.01
Length of Stay	0.65	2.14	4, 4, 76, 223	0.01

Table 4.11 DFA Scores

4.9.3 Discussion of Discriminant Function Analysis (Beach Selection)

As a result of the above analysis, in which the DFA showed no independent effects of extroversion, distance travelled to beach or age in determining beach choice, Model 1 (Fig. 4.6) was rejected. The F-to-enter values of these 3 variables were insufficient to suggest they would add anything to the overall discriminating power of the DFA. The results suggested that beach selection was made on the basis of the distinctive personality characteristic of anxiety trait, and also by the individual's gender, socio-economic status and the length of time he/she intends to stay at the beach location. Model 2 (Fig. 4.7) was built as a result of the data analysis.

The failure to detect the effects of extroversion and age may be explained by their indirect influence on socio-economic status. A further DFA was carried out using these two variables on socio-economic status and it was found that SES

was linearly affected by both. Although extroversion and age did not have independent influence they did play a part in the decision-making process. Interestingly, no linear relationship was found between distance travelled to the beach and beach choice (in contrast to the findings of Cutter *et al.*, 1979), or in fact any of the other variables.

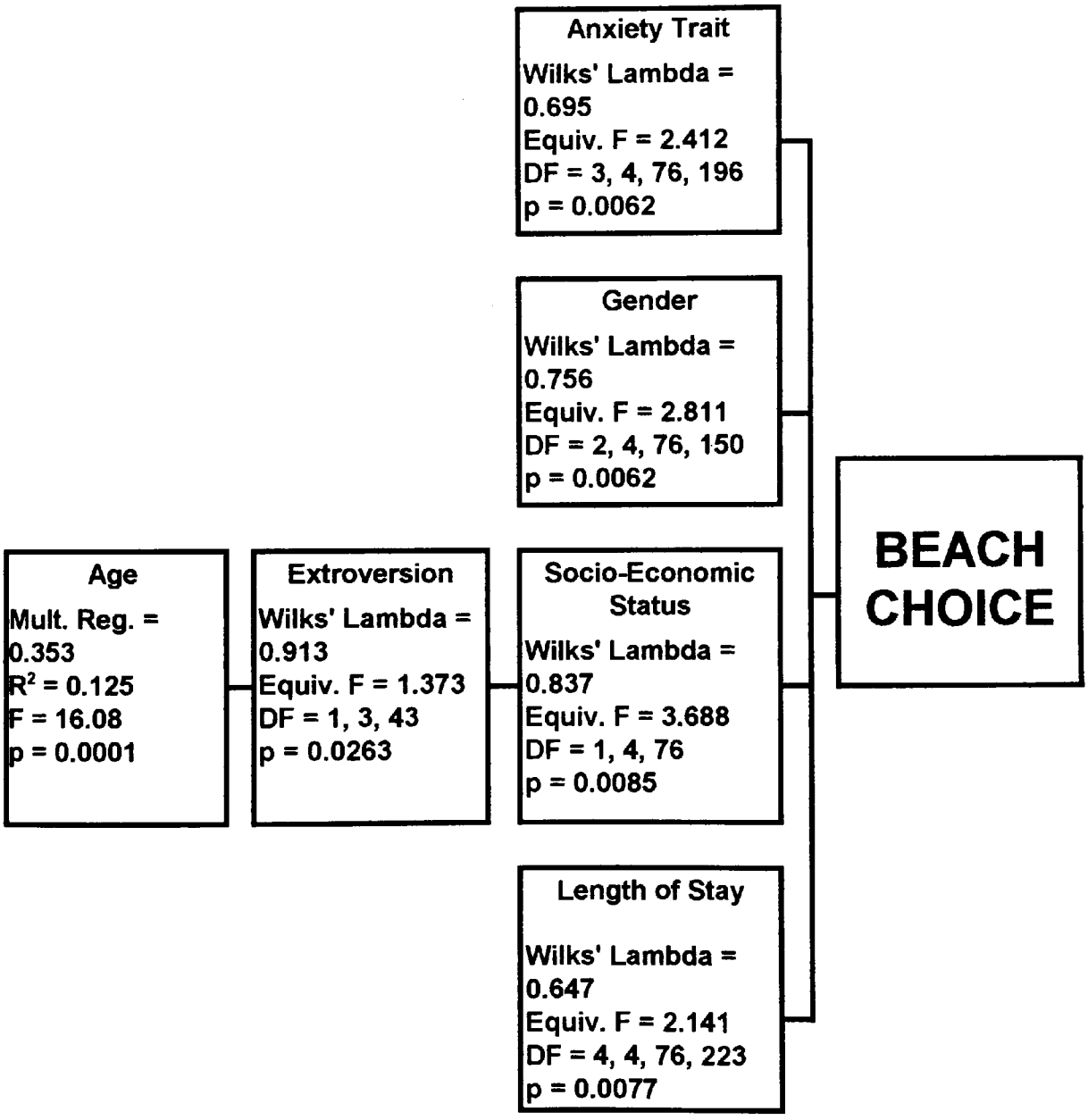


Fig. 4.7 Model of Directional Relationships Between a Range of Variables on Choice of Beach (Model Two)

Whether the Eysenck Personality Questionnaire (EPQ) will prove useful as a device for predicting beach user type is, at present, difficult to judge, as the sample used in this work is not large enough to provide reliable estimates of its validity. In order to use the EPQ in this way, it would be necessary to show that the results found for the GHC samples were validated in other areas showing a more "typical" cross-section of beaches. Additionally, the problem of "faking good" (producing socially desirable responses) must be noted.

It may be that the explanation of why individuals choose specific beach locations may rest more with the interaction of their own ideas of themselves and their expectations of what the beach has to offer them in terms of satisfying;

a) their intrinsic needs;

b) their expectations of the way in which the beach environment and other beach users around them will behave;

c) their perception of the way in which they believe other people expect them to behave.

4.10 Conclusions from Pilot Study

This study was carried out on the GHC, whose management plan has been defined by the philosophies of England and Wales Heritage Coasts, implemented by a Joint Management Advisory Committee, which oversees the area in question. Current "on the ground" management involves clearing beach litter, planting trees, first aid, etc. Two unitary authorities (Bridgend and Vale of Glamorgan) are involved, with an input from the Countryside Council for Wales. Cullen (1982), made 8 recommendations for Heritage Coasts, one of which referred strongly to research policies. Little time and often no academic background with respect to specific problems exists for this amongst personnel implementing management policies.

Beach management appears to be *ad hoc*, with few concessions made to the four key parameters (anxiety/neuroticism, gender, SES, planned length of stay), which this research has shown to be very important. Managers have little control of several aspects of the coastal zone, e.g. pollution from rivers, storm water discharges, but they can control facilities at different beaches and it is this differentiation which needs to be stressed according to these findings. For effective beach management, managers should be aware of the perceptions of the beach user, who comprise their "clientele". Research into these aspects may have a vital future role to play in providing information to improve beach management effectiveness.

In considering ways in which the various perceived and actual qualities of the study beaches could be improved for the benefit of beach users, it is necessary to bear in mind the balance which needs to be struck between promotion of the Glamorgan Heritage Coast area for recreation, and the problems which may be caused by increased visitor pressure. As emphasised by the Countryside Commission (1991) and also Williams & Sothern (1986) with particular reference to the Glamorgan Heritage Coast, where natural beauty and recreation are in irreconcilable conflict, the former should prevail. Williams & Sothern (1986), stated that the carrying capacity of the Glamorgan Heritage Coast had not then been exceeded. However, if improvements to facilities and perceived water quality were to combine with increased awareness of the quality of the Glamorgan Heritage Coast beaches, this might not be the case for much longer. Deterioration of the coastal environment of this area might then take place to an unacceptable degree.

Butler (1991), stated that the environment is a vital resource for tourism and that in many cases the development of tourism has resulted in excessive and unsuitable use of its resources, with negative and undesired effects on the local surrounding environment. Butler (1991), argued that there is a need to educate tourists (even though education will not normally be on their minds), and that this

might best be done in their home areas than in the destination area, by encouraging a wider-than-current knowledge of the environment in all its forms and appreciation of its vulnerability. Presuming an increase in visitor numbers to the Glamorgan Heritage Coast in future years, communication of the Heritage Coast ethos to a very high proportion of visitors will be highly desirable in order to minimise undesired effects on the local environment.

Education of potential visitors should also be attempted in their home areas although this will be even more difficult, and also entail the risk of increasing visitor numbers still further. The most cost-effective methods may be through Tourist Board brochures (primarily aimed at adults), and promotion of the Heritage Coast philosophy in schools. The latter may be especially important considering the disappointing level of awareness (50%), of the Glamorgan Heritage Coast found amongst children at Southerndown. Given the improving average awareness of the Heritage Coast among visitors to it, it may be feasible to consider undertaking this task, although there should be no doubt that it would be a challenge, especially considering the limited resources available for the Glamorgan Heritage Coast.

Some notable differences in client profiles were observed between the four study beaches. Nash Point appeared to attract a considerable proportion of older, introverted people who were interested in aspects of a comparatively undeveloped beach area, such as wildlife, cliff scenery, quiet and solitude. It may be that such visitors would appreciate the provision of one or more information boards (which, on account of the high tidal range and wave energy occurring at this beach, would have to be located in the car park area), briefly describing the Glamorgan Heritage Coast management scheme and the flora, fauna and geology of the immediate area. It also seems that beach users were generally satisfied with the limited facilities available at this site, but showed some concern about the difficulty of access to the beach area from the cliff-top car park.

The quality of the car parking, seating and refreshment facilities at Llantwit were well appreciated, and considered appropriate by the beach users there. However, awareness of the Glamorgan Heritage Coast scheme was disappointingly low (at 64%), indicating that many beach users were not aware of the role which this scheme has played in controlling and modifying development at this beach. At Ogmore in contrast, refreshment facilities were poorly regarded. Overall, apart from possibly at Ogmore it was concluded from results of the survey that facilities and level of commercialisation currently existing at each site were considered by beach users, as being appropriate to that site.

Southerndown appeared to attract the younger, more extrovert beach user, planning a longer stay at the beach. This beach was also perceived to be significantly safer and better for swimming than the other study beaches. It was felt that awareness of the Heritage Coast scheme might increase with better signposting of the Glamorgan Heritage Coast Headquarters and Information Centre. It appeared (from the limited sample obtained at Southerndown), that children were less concerned with the sea and swimming when visiting the beach, and more interested in other beach activities.

A number of interesting conclusions concerning water quality were drawn. Perceived water quality was markedly worse at Ogmore than at the other three study beaches, and it may be that the perception by beach users of considerable amounts of litter in the beach area, and the proximity of what may be viewed as a potential source of pollution (the Pen-y-bont Sewage Treatment Works), contributed to this. No clear association between water clarity and overall beach quality was observed. However a close link was suggested between perceived water quality and suitability of the beach for swimming.

Female beach users perceived water quality to be poorer, as did beach users of high SES. Male users found coastal views more attractive. Those of high SES were more critical of facilities such as shortage of toilets and seating facilities. Current beach management policies take little account of gender or SES

of visitors, but this research showed a marked difference in beach perception according to these parameters. Beach users with a high anxiety trait score and introverted personality type, preferred to visit Nash, the quietest, least crowded beach of the four studied. Visitors to Nash planned a shorter stay at the beach compared to the busier beach at Southerndown. Extroverted visitors considered refreshment facilities to be better, bathing waters to be safer, and better protected by lifeguards. Visitors who had travelled furthest to the beach considered car parking to be poorest, but seemed more tolerant of other poor facilities. Seven psychological and socio-demographic factors were investigated of which four were found by stepwise DFA to be of primary importance in beach selection. These were anxiety/neuroticism, gender, socio-economic status and planned length of stay.

Promotion of the Heritage Coast concept of conserving the environment while maintaining the recreational quality of the coast (Williams, 1992), could facilitate soliciting the aid of the visiting public in preserving the quality of the environment, and also help to ensure that the behaviour of visitors does not deteriorate (or even improves), as their numbers increase. This might help to encourage what has been described by Butler (1991), as non-destructive and "environmentally sympathetic" tourism. Even so, it needs to be borne in mind that even the environmentally sympathetic tourist can be damaging to the environment.

The principle of sustainable development with regard to beach tourism is difficult to apply in practice, even if it has been largely successfully done on the Glamorgan Heritage Coast up to the present time. The continued application of this principle in the likely event of increased visitor numbers in future years and in the face of limited resources, is the great challenge facing the Glamorgan Heritage Coast. This pilot study suggested that employment of beach user opinion/perceptions studies to management questions may be able to make an important contribution in this regard, and to CZM in general.

4.11 Management Suggestions Arising from the Pilot Study

i) At Nash, consideration should be given to the improvement of the path leading from the car park to the beach. However at the same time it should be considered whether such a development would increase visitor numbers, and possibly detract from the unspoilt, natural appearance of the beach. The Glamorgan Heritage Coast management should also give consideration to the provision of a simple information board in the Nash car park area, giving details of the history, flora, fauna and geology of the immediate area.

ii) The Glamorgan Heritage Coast management should consider ways of more widely publicising its activities and management philosophies. This might lead to an increase in Heritage Coast awareness at the GHC, and a greater appreciation amongst beach users of the importance of the Heritage Coast scheme in coastal management. However, it would be necessary to consider carefully whether such a step might lead to an undesirable increase in visitor numbers.

iii) At Southerndown, signposting of the Glamorgan Heritage Coast Headquarters and Information Centre from the refreshment and toilet area could be improved.

iv) With the possible exception of Ogmore, changes to the overall level of facilities at the four study beaches is not desired by users.

v) The appropriate authorities should make efforts (including the provision of simple, prominently situated information boards), to assure beach users at Ogmore and Llantwit that subject to analysis by the EA, water quality is suitable for swimming and other water-based activities.

vi) Consideration should be given to the provision at appropriate locations of signs (possibly similar in character to those used by the National Trust at points of access to its properties), bearing a distinctive Heritage Coast symbol and short message to the effect that the area being entered is being managed by the Glamorgan Heritage Coast. Such locations might be points of access to the Heritage Coast area via footpaths, pedestrian exits from car parks and points of pedestrian access to beach areas. Such signs might increase visitor awareness of the existence of the Glamorgan Heritage Coast. The Heritage Coast management would have to decide whether such action is desirable, for example in terms of causing a possibly undesirable increase in visitor numbers. At selected sites such signs could be combined with somewhat more comprehensive signs briefly indicating the management philosophy of the Glamorgan Heritage Coast, and improvements to the area previously carried out under its auspices.

vii) Means of increasing the awareness of the philosophy and aims of the Glamorgan Heritage Coast amongst young visitors should be examined, and might include the preparation and distribution of a video simply and briefly describing these aspects to schools in the S.E. Wales area (from which the majority of visitors originate), and possibly further afield.

CHAPTER 5

THE DEVELOPMENT OF A USER-BASED BEACH RATING SYSTEM

5.1 Introduction

As described in Chapter 2.5, a dearth of work exists with respect to rating beaches in an objective and quantitative manner. Existing beach rating/award systems are based on a small number of measurable parameters and do not approach coverage of all possible aspects of the topic (Williams & Morgan, 1995).

5.2 Assessment of Landscape Quality

In view of the number of beach landscapes (70) to be assessed in this exercise it was considered that the use of panoramas made up of transparencies or still photographs (which would total 420 allowing for 6 per beach), would be impracticable on grounds of viewer fatigue and time usage. Movie film allows the presentation of an entire landscape view (Nassauer, 1982) and largely removes problems of framing and composition inherent in still photography. The cost and convenience disadvantages mentioned by earlier workers (Clamp, 1976; Nassauer, 1982) are now much less marked than formerly. A video panorama technique based on those of Clamp (1976) and Banerjee (1977) was therefore selected for this investigation.

Rating scales have often been used to express environmental preferences (e.g., Schroeder & Daniel, 1981). Scaling methods differ in complexity and ease of use. Complex methods have been applied in many studies of environmental perception (e.g., Schroeder & Daniel, 1981; Hull & Buhyoff, 1983), while simpler methods have been used by others (e.g., Brush, 1979). Schroeder (1984) compared several methods for scaling environmental perception data and found that a simple mean rating produced results almost identical to more complicated scaling methods. Schroeder (1984) found that groups of as few as 9 individuals

could be adequate, providing intergroup reliability coefficients above 0.9, but researchers of environmental perception have generally considered that a high level of reliability can be achieved with groups of 15 to 25 raters (Brush, 1976; Craik, 1972; Schroeder & Daniel, 1980). The aim in this study therefore, was to obtain ratings of the beach panoramas from at least 20 individuals.

5.3 Methodology

5.3.1 Introduction

It was regarded as essential that a beach rating system should endeavour to take into account:

(i) all aspects of beaches which could be identified (or reasonably assumed) to be of importance to beach users, provided these could be assessed in a quantitative or semi-quantitative manner. Assessment could be made either on the basis of on-site inspection of the beach, or from published or otherwise obtainable data;

(ii) the preferences of beach users for all aspects in (i) above and weighted according to their priorities;

(iii) the differing preferences and priorities of beach users according to their preference for visiting beaches with varying levels of commercial development.

Ideally, such a system could quantitatively evaluate beaches on the basis of stated desires of beach users themselves. A beach rating methodology was therefore conceived founded on the use of two interrelated data bases; a beach user questionnaire to assess preferences and priorities of a representative sample of beach users in Wales, and a checklist with which to record quantitative beach

data as in (i) above. Data from the questionnaire survey would then be used to correctly weight (in terms of scoring), the various beach factors on a checklist.

5.3.2 Requirements of the Questionnaire

A questionnaire was required which would assess:

i) The preferences of beach users for selected beach factors, where preference could be expected to vary from one beach user to another. These factors included sand colour, bathing water temperature, beach facilities, beach regulation with regard to water sports, dogs. A full list is given in Table 5.1.

ii) The priority placed by beach users on each of the factors of the beach environment of importance to them and assessed by the checklist. Fifty such factors were incorporated.

iii) The type of beach (according to level of commercialisation), the particular beach user preferred to visit.

Beach substrate	Access onto beach
Sand colour	Car parking location
Sea temperature	Water sport management
Thermal sensation (warmth/cold)	Refreshment facilities
Beach exposure	Alcoholic drink availability
Sand cover	Beach width at low tide
Wave size	Beach width at high tide
Beach slope	Vehicles allowed on/banned from beach
Beach slope below water line	Dogs allowed on/banned from beach
Road access	

Table 5.1 Beach Factors Requiring User Preference Selection in Questionnaire

In terms of dividing beaches into categories of commercialisation, observations made of beaches on the Gower Peninsula and other South/West Wales beaches including Tenby, Barry (Whitmore Bay) and Porthcawl (Trecco Bay and Sandy Bay), led to the creation of 5 such categories. These categories were from "a" to "e" in gradations of increasing level of commercial development:

(a) "An undeveloped beach with no facilities for visitors at all."

(b) "A beach with a few facilities: just a toilet, small refreshment kiosk and car park."

(c) "A beach at a small resort with toilets, cafe selling meals, drinks, ice-creams, etc., a lifeguard at busy weekends and large car park."

(d) "A beach at a medium sized resort with several cafes, one or more restaurants, fast food outlets, some other shops, washrooms with showers and car parks."

(e) "A beach at a large, highly developed resort with many cafes, restaurants, shops, amusements, etc."

Questions on the questionnaire would be required to closely align with factors featured in the checklist, so that a direct link could be made between questionnaire responses and checklist beach factors. This alignment was necessary in terms of both the identity of the factors themselves (e.g. sand colour, water temperature, absence of litter), and also, where beach user preferences were measured by the questionnaire, in terms of the categories within them (e.g. for sand colour, white, light tan, brown, grey, black sand). As a result of this alignment and taking into account stated preferences of beach users for the type of beach they would prefer to visit (categories "a" to "e" above), questionnaire data could be processed to attribute correctly weighted scores to particular values of each beach factor featured in the checklist, for each beach type. By these means,

the factors most important to beach users could make up appropriately large proportions of the total beach rating score.

5.3.3 Questionnaire Design Development

As discussed in the literature review (Chapter 2), little work could be traced regarding questionnaire investigations of beach user preferences and priorities. This meant that as far as questionnaire design was concerned, this study lacked a firm basis of previous experience on which to build. While opinions of coastal experts, previous beach checklists and other beach rating systems formed a basis for selection of aspects to be included in the questionnaire, actual design of the questions themselves and the layout of the questionnaire had to be done on the basis of examination of other questionnaires otherwise unrelated to this study and developed on a "trial-and-error" basis.

A questionnaire was designed incorporating questions asking for preference selection regarding 21 beach features in Part 1, followed by questions in Part 2 where 54 beach aspects could be prioritised on a 1 to 5 scale from "very important" to "not important" (Appendix 5). The questionnaire also asked which type of beach out of 5 options in terms of commercialisation, the person completing the questionnaire would prefer to visit. The questionnaire was 7 pages in length, without including socio-demographic questions. This questionnaire was piloted on 12 porters and non-technical staff at the University of Glamorgan to assess ease of completion and generally garner comments regarding its content and structure. University of Glamorgan staff were used for reasons of accessibility and convenience, allowing more rapid development of the questionnaire than would have been the case if beach users had been used for this purpose. Also, early stages of questionnaire development took place early in 1994 when there would have been few beach users available to complete the questionnaires.

Examination of the completed questionnaires showed that in Part 2 there was a tendency for habitual circling of the number "1" on the 1 to 5 scale ("very

important"). In an attempt to reduce this tendency to assess every beach aspect as "very important", Part 2 of the questionnaire was changed to a "bipolar" format. An example of one such question is shown below:

	very important				not important	
The sea must be free of pollution	**1**	**2**	**3**	**4**	**5**	**Pollution in the sea does not matter to me**

This questionnaire (Appendix 6), was also piloted on 10 porters and non-technical University of Glamorgan staff. It was found that there was still a tendency to circle "1" for "very important" for a large proportion of priority questions. In an attempt to resolve this problem, two questionnaire versions were devised. One used the same format as the previously tried version but with modified wording in Part 2 which it was hoped, would lead those completing it to more carefully consider their estimation of the importance of the various beach aspects (Appendix 7). The other version was identical apart from the fact that Part 2 questions were randomly orientated between "very important" at the "1" end and the "5" end of the 1 to 5 scale (Appendix 8). These two versions were piloted in parallel at beaches in south-east Wales and the Gower Peninsula during late May, 1994. Included in both versions were an example question to demonstrate the correct way in which to complete the preference selection questions (Part 1; 20 questions), 47 questions in Part 2, Part 3 asking beach users to rate 5 broad-based beach facets (see later in this Chapter), and a final section asking people which type of beach they preferred to visit. The questionnaires were still 8 pages in length.

Examination of completed questionnaires after this comparative trial showed that in general, the version with random orientation of Part 2 questions gave better discrimination of user priorities for different beach aspects, reducing the tendency to indicate a large proportion of aspects as very important. However,

this tendency still existed in the first few questions in Part 2. It was also seen that the boxes on the questionnaire where beach users were asked to enter numbers to indicate their preference for beach aspects, were inconveniently small.

In the next version (Appendix 9), these boxes were enlarged, some socio-demographic questions were added (this section becoming the new Part 1 of the questionnaire), and 5 repeated "dummy" questions added at the start of the priority rating section (now Part 3). It was hoped that these "dummy" questions would allow beach users to become accustomed to the method of completing this part of the questionnaire, so that the "live" questions would be filled in correctly. This version was again piloted at beaches in south-east Wales in early June 1994.

Results with this version (Appendix 9), were generally adequate, but it was felt that some minor improvements to the questionnaire's appearance could usefully be made. The section of socio-demographic questions was also enlarged to cover age, gender, occupation, distance travelled, planned length of stay, place of origin and accommodation. These modifications led to the final questionnaire version (Appendix 10). This was piloted at Port Eynon and Oxwich (15 questionnaires per beach) in June 1994. The responses were considered to be satisfactory and this version of the questionnaire was duplicated for use in the main beach user survey in Wales.

As discussed in Chapter 5.2, it was considered that landscape/scenic quality could not be defined in terms of presence or absence of individual attractions or detractors. Similarly, as the questionnaire was developed it was considered inappropriate to ask beach users to weight individual components of landscape and scenic quality against the other beach factors. Accordingly, landscape/scenic quality was weighted relative to other questionnaire factors in an indirect fashion, via an additional questionnaire section ("Part 4"), in later questionnaire versions. In this section, beach users were asked to put 5 major facets of the beach environment ("Facilities", "Sand and Water Quality", "Attractive Views and Landscape", "Bathing and Swimming Safety" and "Access and

Parking"), in order of priority from 1 (most important) to 5 (least important). Four of these broad-based facets (i.e. all except "Attractive Views and Landscape") each corresponded to a number of beach factors featured in "Part 3" (priority rating section) of the final questionnaire (Table 5.2).

Facilities		**Bathing and Swimming Safety**
Fresh water for washing and drinking		Absence of strong currents
Presence of toilets		Absence of undertows (rip currents)
Cleanliness of toilets		Absence of large, dangerous waves
Presence of showers		Water does not quickly get deep
Availability of sunbeds and chairs		Presence of lifeguards
Refreshment facilities		Absence of dangerous animals
		Absence of rocks, etc. in water
Sand and Water Quality		
Absence of sewage debris		**Access and Parking**
Clarity of bathing water		Road access
Bathing water pollution		Location of car parks
Absence of floating debris		Access to the beach
Absence of litter		
Absence of oil on the beach		

Table 5.2 Factors Included in 4 Major "Beach Facets"
(Part 4 of Questionnaire)

For each completed questionnaire, beach user priority scores were totalled for the questionnaire factors corresponding to each of these broad-based facets. These totals from Part 3 were compared to the rankings from Part 4 of the questionnaire and allowed calibration to be made of the ranked facets (including "Attractive Views and Landscape") in terms of priority score, against totalled priority scores from Part 3.

A beach user priority score for landscape/scenic beauty was calculated, which was halfway between those totalled priority scores for broad-based facets ranked immediately above and below the "Attractive Views and Landscape" facet

in Part 4. If the "Attractive Views and Landscape" facet had been given a ranking of one on a particular questionnaire, the difference between the totalled priority scores for the second and third ranked facets, was added to the score for the second ranked facet. The "Attractive Views and Landscape" facet was given this calculated score. Similarly, if the "Attractive Views and Landscape" facet was given a ranking of 5, the difference between the totalled priority scores for the third and fourth ranked facets was subtracted from the score for the fourth ranked facet.

An example below shows a case where "Attractive Views and Landscape" was ranked third of these 5 facets:

Facet	Total Priority Score from corresponding questions in Part 3 of Questionnaire	Rank given in Part 4 of Questionnaire
Sand and Water Quality	9.74	1
Bathing and Swimming Safety	8.05	2
Attractive Views and Landscape	-	3
Facilities	7.20	4
Access and Parking	4.23	5

The priority score for "Attractive Views and Landscape" for this case was calculated as: (8.05 + 7.20)/2 = 7.63

This methodology is a form of Guttmann scaling (Stouffer, 1950), but in practice over a large sample size a perfect Guttmann scale is seldom obtained (Blalock, 1979). Six hundred and sixty two of the 859 questionnaires accepted for beach user preference/priority scoring were satisfactory in this regard. In the remaining 197 cases, it was observed that the response patterns of individuals deviated from the ideal, i.e. the ranking order of the 5 facets in Part 4 of the questionnaire did not match the numeric order of the relevant totals from Part 3. The most common problem was that the sum of the totalled priority scores attributed to beach access and parking from Part 3 of the questionnaire, was the

lowest of the 4 facets totalled from Part 3, but the rank given in Part 4 to "Good Access and Parking" was one higher than it should have been (i.e. "3" instead of "4", or "4" instead of "5"). When this occurred and the error was associated with the ranking of "Attractive Views and Landscape" in Part 4 of the questionnaire (where "Attractive Views and Landscape" was ranked directly above or directly below "Good Access and Parking"), the same priority score was given to "Attractive Views and Landscape" for that questionnaire, as the totalled priority given to beach access and parking. This procedure applied to 131 questionnaires. For the remaining 68 questionnaires an estimate was made of the priority score to be given to "Attractive Views and Landscape", from inspection of the ranking table from Part 4 of the questionnaire and the totalled priority scores derived from Part 3.

Deciding the degree of error in Guttmann scales that can be tolerated is an arbitrary decision (Blalock, 1979). In view of the novel and exploratory nature of the study, in particular the attempt to attribute the percentage of total beach rating score which should be assigned to landscape quality, and also considering the absence of a readily available alternative, the Guttmann scaling methodology was persevered with in calculating the results of this study. Together with the difficulty of obtaining a representative sample of the beach using population, this aspect may perhaps be regarded as the greatest source of error in the results of this study.

5.3.4 Questionnaire Survey Design

In deciding which beaches to select for the questionnaire survey in order to obtain a representative sample of Welsh beach users, it was necessary to take into account the large variations in beach visitor numbers between the many beaches in Wales. Firstly, a list was drawn up of all beaches in Wales which might reasonably be considered for selection. This list was compiled from the listing of Welsh beaches in the "Good Beach Guide - 1994" (MCS, 1994), the list of beaches receiving the Tidy Britain Group's "Seaside Award" in 1994, beaches

identified by the NRA's Bathing Water Report for 1993 (NRA, 1994), and inspection of 1:50 000 Ordnance Survey maps of the Welsh coast. This produced a total of 202 beaches (Appendix 11).

To obtain a reasonable cross-section of Welsh beaches, it was considered that approximately 20 - 24 beaches would be an appropriate number to survey using the questionnaire; this would generate a total survey sample size of 1000 - 1200. Randomly selecting this number of beaches from the 202 listed, would be likely to result in the selection of many beaches with few visitors during typical summer conditions. This in turn would be likely to lead to logistic difficulties in terms of the amount of time required for the questionnaire survey to be completed. It was therefore decided to stratify the population of beaches by dividing them into two categories; EC-identified bathing beaches (required to comply with the EC Bathing Waters Directive; 76/160/EEC), and non-identified beaches. From the list of 50 EC-identified bathing beaches geographically within Wales at the time of the study (1994; NRA, 1994), 14 beaches were randomly selected and a further 10 were randomly selected (in both cases using random number tables), from the remaining non-identified beaches. These beaches are shown in Table 5.3.

Yeomans (1967) and The Welsh Agricultural College (1992) estimated an approximate 2:1 ratio of weekend to weekday visitors to Welsh coastal and country leisure destinations. Sampling at each beach was balanced with the intention of reflecting this ratio. The aim was to obtain 34 questionnaire responses at weekends (Saturdays and Sundays) and 17 on weekdays (Monday to Friday, excluding Bank Holidays) at each beach to be surveyed using the questionnaire, so giving a total of 51 completed questionnaires per beach. The main part of the questionnaire survey work was carried out during July and August 1994. However, the four selected beaches in the Pembrokeshire Coast National Park could not be surveyed by the National Park staff due to other commitments - these beaches were therefore surveyed during June/July 1995 with some assistance from staff/students of Pembrokeshire College, Haverfordwest. Assistance with questionnaire survey work was also obtained from Glamorgan Heritage Coast

staff, Ceredigion Heritage Coast staff, and staff of the School of Applied Sciences, University of Glamorgan. In terms of sampling beach users at individual beaches the problems and considerations discussed in Chapter 4.5.1 in relation to the GHC study were again relevant. As in the GHC study, at each beach in this main study an approximation to a stratified sample was obtained by approaching groups, couples and individuals of a variety of ages and both sexes.

Beach	√ = EC identified bathing beach		Beach	√ = EC identified bathing beach
Barry - Whitmore Bay	√		Pwllgwaelod	-
Ffontagari	-		Mwnt	-
Nash	-		Llangranog	-
Southerndown	√		New Quay	√
Limeslade	√		Aberaeron	-
Port Eynon	√		Aberystwyth (South)	√
Rhossili	√		Llandanwg	√
Llangennith	-		Harlech	√
Amroth	√		Morfa Bychan	√
Saundersfoot	√		Morfa Aberech	-
Manorbier	-		Morfa Nefyn	-
Broad Haven	√		Kinmel Bay	√

Table 5.3 Beaches Selected for Questionnaire Survey

The actual number of completed questionnaires obtained for each beach is shown in Table 5.4. A total of 1004 beach users were surveyed (669 at EC-identified beaches and 335 at non-identified beaches), with a reported refusal rate among beach users of <2%. At one of the selected beaches (Mwnt), Ceredigion Heritage Coast staff reported no visitors suitable for surveying on two visits to the beach; no data was therefore collected for this beach. Other commitments of Glamorgan Heritage Coast staff at Nash and Southerndown resulted in only 17 and 14 questionnaire responses respectively at these beaches. Low visitor numbers at Pwllgwaelod and Morfa Aberech, resulted in only 5 and 9

questionnaire responses respectively being gained. Hence of the 24 originally selected beaches, near-full quotas (i.e. approximately 50 questionnaire responses), were obtained from 19 (13 EC-identified and 6 non-identified beaches; Table 5.4).

Beach	Total no. of questionnaires	No. accepted for socio-demographic analysis	No. accepted for preference/ priority analysis	√ = EC identified bathing beach
Barry-Whitmore Bay	51	51	37	√
Ffontagari	50	48	37	-
Nash	17	17	15	-
Southerndown	14	14	8	√
Limeslade	50	50	48	√
Port Eynon	51	51	46	√
Rhossili	48	48	41	√
Llangennith	51	51	48	-
Amroth	52	50	50	√
Saundersfoot	51	48	48	√
Manorbier	53	52	52	-
Broad Haven	51	50	50	√
Pwllgwaelod	5	5	5	-
Llangranog	47	47	41	-
New Quay	47	46	40	√
Aberaeron	53	53	42	-
Aberystwyth (South)	51	51	43	√
Llandanwg	52	51	41	√
Harlech	49	49	44	√
Morfa Bychan	51	51	42	√
Morfa Aberech	9	8	8	-
Morfa Nefyn	50	48	39	-
Kinmel Bay	51	49	34	√
Total at EC-identified beaches	669	659	564	
Total at non-EC beaches	335	329	295	
Total	1,004	988	859	

Table 5.4 Number of Questionnaires Obtained per Beach

5.3.5 Checklist

While it was desirable that the final checklist should include all those aspects of beaches which could be considered to be of importance to beach users, it was also necessary to consider that in order to eventually obtain a numerical beach rating value, some limitations would have to be imposed. Firstly, as mentioned above (Chapter 5.3.1), the checklist could only include those aspects of a beach which could be either quantitatively (or using reasonable judgement, semi-quantitatively), assessed by visiting the beach area itself during the summer period; or quantitatively assessed from current published or otherwise available data. On this basis, some aspects such as beach management structures and promotion of educational activities (which are taken into account by the TBG in its Seaside Award) were excluded. Also, some aspects (e.g. salinity, seismic activity, fragility of marsh ecology) featured in the checklist of Chaverri (1989), were considered not to be of significant importance to beach users in Wales, on the basis of the opinions of coastal experts and the opinions of beach users themselves as assessed in the 1991 GHC survey (Morgan *et al.*, 1993).

As first compiled on the basis of considerations described above, the checklist comprised classifications and categories for 48 beach factors. These beach factors were selected from those which have been shown to be of importance to beach users in previous work (Morgan *et al.*, 1993), used in existing beach rating systems, suggested by a variety of European coastal experts or featured in previous beach checklists (e.g. Chaverri, 1989; Williams *et al.*, 1993b). The beach factors were divided into "physical" (17), "biological" (10) and "human use" (21) groups in similar fashion to the factors featured in the checklist used by Williams *et al.*, (1993b). These factors are listed in Table 5.5.

Physical	Biological	Human Use
Beach width (low tide)	Floating debris	Odours from industry
Beach width (high tide)	Smells of seaweed, etc.	Traffic fumes
Beach material (above high water mark)	Birdlife	Odours from catering
Beach material (below high water mark)	Rockpool fauna	Beach litter (non-sewage)
Water temperature	Insect pests	Oil on beach
Beach microclimate (exposure to wind)	Harmful/dangerous animals in the water	Vehicle access to resort/ beach
Breaking wave size	Seaweed on beach	Car parking location
Beach slope above high water mark	Sewage debris on beach	Beach access from car park
Distance from water edge to 50cm depth	Microbiological water quality	Toilet provision
Submerged objects (rocks, etc.)	Flora in vicinity of beach	Cleanliness of toilets
Sand colour		Shower provision
Amount/thickness of sand		Fresh water provision
Presence of dangerous cliffs		Refreshment facilities
Water clarity		Alcohol availability
Beach safety rating		Availability of chairs/ sunbeds.
Landscape/scenery quality		Lifeguard provision
Climate		Vehicle noise
		Noise from industry
		Vehicles on beach
		Dogs, etc, on beach
		Control of watersports

Table 5.5 Beach Factors Featured in Checklist

Categories for these factors were based on the opinions of coastal experts or adapted from existing beach checklists/rating systems. Categorisations were given on the checklist in as quantitative a fashion as reasonably possible, given the requirement to tie the checklist categories for many factors to preference selection on the beach user questionnaire. Of the 48 factors, categories for 15 were defined entirely on the basis of quantitative data (e.g. beach width, number of toilets, climate, microbiological water quality), and 7 human use factors were

precisely defined in terms of activities permitted/banned or facilities available/not available. Categorisation of beaches with regard to the remaining beach factors was assisted and simplified as much as possible by providing concise definitions for each category. For example, the categories for beach access were "no clearly visible path to the beach", "path rough/steep/with steps", "level path to beach" and "road or wide tarmac/concrete path".

A pilot version of the checklist (Appendix 12) was used in a trial study at 7 Gower beaches on June 1 - 2, 1994. These beaches (Mumbles, Caswell, Langland, Three Cliffs Bay, Oxwich, Port Eynon, Rhossili), were selected on the basis of expected variation in physical characteristics, levels of facilities and commercial development. This pilot checklist was considered to be generally satisfactory in use, with only a few modifications being necessary. One adjustment required was regarding the assessment of beach material above and below high water marks. Often, beaches consisted of a mixture of materials in terms of area covered by each, the most common being beaches partly of sand and partly "cobbles" (>5 cm diameter) above the high water mark in the form of pebble storm beaches. Therefore for the main study, the percentages in terms of area of each type of material (cobbles, gravel, sand, mud), were recorded for each beach above and below the high water marks. Sewage debris amount was originally categorised in terms of number of items per 100 m of strandline ("absent", "1 - 10 items", "more than 10 items"). In the pilot study it was found that a more appropriate categorisation to differentiate moderate from heavy sewage debris contamination, would be to estimate the number of items per 10 m of strandline, from examination of a 100 m length. As far as general litter contamination of the beach was concerned, it was found that better discrimination than the original three categories ("usually abundant", "some present", "absent"), was achievable and appropriate. In the final checklist the middle litter category ("some present"), was divided into upper and lower divisions.

The definitions of beach categories in terms of commercialisation (see Chapter 5.3.2), were added to the final checklist version so that all beaches at

which it was used could be classified into one of the categories. Finally, improvements were made to the layout of the checklist, so producing a final version, which was considered satisfactory for use in the main study (Appendix 13).

As mentioned in Chapter 5.3.2, close linkage was required of categorisations of beach aspects between the questionnaire and the checklist. For several questionnaire questions where preference selection was required, descriptions on the questionnaire were simplified somewhat from the corresponding categories on the checklist. The questionnaire descriptions corresponding with the checklist descriptions or numerical values for these cases are shown in Table 5.6.

Forty nine bathing beaches in Wales identified under the EC Bathing Water Directive (CEC, 1976), were assessed using the checklist. Twenty one other beaches, mainly in the southern half of Wales, were also selected for assessment, making a total of 70 beaches (Figs. 3.2a and 3.2b). These additional beaches were selected mainly on the basis that they had received TBG Seaside or Premier Seaside Awards in 1994, or had been recommended by the 1994 Good Beach Guide (MCS, 1994).

Checklist Numerical Value/Description	Questionnaire Description
Beach Material:	
Cobbles (>5 cm)	Stones bigger than a golf ball
Gravel (1 to 50 mm)	Gravel
Sand (0.1 to 1 mm)	Sand
Mud	Mud
Beach Microclimate:	
Very exposed	Very exposed
Sheltered, some breeze	Sheltered, but with some breeze
Tightly enclosed/over sheltered	Sheltered from all breezes
Average beach slope above high water mark:	
<5°	Flat
5 - 20°	Gently sloping
Very steep (>20°)	Steeply sloping
Distance from water edge to 50 cm depth:	Water depth 10 yards into sea:
3 m or less	Up to my neck
3 - 7 m	up to my waist
7 - 20 m	up to my knees
>20 m	at my ankles
Access to car park by vehicle:	
Road mainly single track with passing places	Down a narrow road
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50 m apart	Signs, but not a wide road
Well signposted (to beach/resort/nearest car park), over 4 m wide	Wide, signposted road
Access to beach from car park:	
No clearly visible path	No path at all
Path rough or steep or with steps	A rough path
Good level path to beach	A level path
Road or wide tarmac/concrete path	A road or tarmac path to walk on
Refreshments/cafes:	
None	No cafes or kiosks
Basic refreshments	Just basic refreshments
Wide selection of food & drink	Cafes with a wide selection of food

Table 5.6 Corresponding Questionnaire and Checklist Descriptions

5.4 Landscape Assessment

Landscape was assessed at 70 beaches in Wales, UK (Figs. 3.2a and 3.2b), by the production of a S-VHS video film panorama at each beach. Filming was carried out by mounting the S-VHS video camera on a levelled tripod at a point approximately 50m from the landward edge of the beach and adjacent to the National Rivers Authority (NRA; now Environment Agency), water sampling location (where such a location was listed; NRA, 1994), or otherwise at the centre of the most heavily used part of the beach. The camera lens' focal length was adjusted so that where possible, all natural and man-made structures of high relative relief (e.g. cliffs, tall buildings), could be included in the field of view, down to the minimum focal length of 8 mm (42° angle of view). The maximum focal length employed for any beach was limited to 16 mm (21° angle of view), even where no substantial relative relief was present. This was done in order to limit variation in this factor between beaches and because the use of focal lengths of greater than 16 mm, resulted in a high apparent angular velocity of camera panning which made viewing difficult.

The camera was pointed in a seaward direction, activated and smoothly panned through 360° in an anti-clockwise sense over a period of 30 - 35 seconds. In all cases the focal length was kept constant throughout filming of the panorama. Three panoramas per beach were recorded and the best in terms of smoothness of panning was selected for inclusion in the final edited tape. Beaches were filmed between 28 July and 22 September 1994 (Appendix 14) on days of dry weather. Filming was carried out within 3 hours of local low tide between the hours of 10 am and 5 pm.

Beach panoramas were placed in a random order in the final tape. Intervals were left of approximately 10 seconds between each beach panorama to allow judges time to consider their score for the preceding beach. Beaches were identified on the tape by number only and this voice identification was the only soundtrack present on the final tapes produced for rating. Beach panoramas were

assessed in a semi-quantitative fashion by observation, in terms of visible wave size, number of people present on the beach and cloud cover to establish the effect of these temporally variable parameters on the rating scores obtained. Prominence of man-made structures and vehicles was also assessed in the same way using a 1 to 5 scale.

Beaches were rated by a panel of 24 coastal managers comprising Wardens and other officers of the Pembrokeshire Coast National Park, Glamorgan Heritage Coast, Ceredigion Heritage Coast, and other regionally based coastal experts. Group sizes for each viewing ranged up to 6. Before the tape was played, raters were told that the purpose of the exercise was to "judge the scenic beauty of each video panorama". The tape was then played, with a short break of 2 - 3 minutes at half-way (after 35 beach panoramas), to lessen the possibility of viewer fatigue. Judges were asked to give each panorama a score between zero and 20. Mean scores for each beach were calculated. The data was tested using stepwise multiple regression for any correlations between mean beach score and visible wave size, number of people present, cloud cover, type of beach (in terms of level of commercialisation on a scale of 1 - no facilities, to 4 - beach at a medium/large resort), and prominence of man-made structures/vehicles. Finally, the data was examined to check for "drift" in rater scoring during the panorama sequence.

5.5 Development and Use of a "Beach User Climate Index"

Many tourists are largely (perhaps entirely), motivated by climatic considerations to select their holiday destinations and resort areas (Mieczkowski, 1985). Beach use in particular is a highly weather sensitive recreational activity (De Freitas, 1990). In warm temperate (e.g. Mediterranean) climates, optimal atmospheric conditions for beach use often occur outside the busiest summer months and generally, the period of peak demand is not justified by seasonal climatic conditions (Yapp & MacDonald, 1978). The difference in atmospheric conditions between peak usage periods and other periods during which more

favourable conditions frequently exist, may often be sufficient to justify advertising and promotion to encourage a more even distribution of beach usage. A requirement for this would be a better knowledge of preferred beach recreation climate so that its relative attractiveness could be promoted.

Recreationists tend to respond to the integrated effects of the atmospheric environment; at any given air temperature the thermal conditions experienced will vary depending on the influences of wind, humidity and solar radiation (Mieczkowski, 1985). Several attempts have been made to devise climate indices in relation to various types of tourism, taking into account these and sometimes other factors (e.g., Green, 1967; Terjung, 1968; Paul, 1972; Danilova, 1974; Mieczkowski, 1985; De Freitas, 1990). De Freitas (1990) used beach user's verbal expressions to assess on-site atmospheric conditions in terms of their thermal environment, using the scale of the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE; Winslow *et al.*, 1937, 1938; Roberts, 1959; Rohles, 1974). This scale was found to be easy to apply to field studies (De Freitas, 1990) and to correlate well with more elaborate procedures (e.g., the Likert scale; Oppenheim, 1966). These verbal expressions were correlated with calculated body-atmosphere energy budgets (HEBIDEX and STEBIDEX; De Freitas, 1985) to assess the optimal state of pleasantness; this was at a point between "slightly warm" and "warm" and contrasted with the common assumption (Fanger, 1970), that thermal comfort was equivalent to thermal neutrality.

Mieczkowski (1985) used ASHRAE (1972) measures of effective temperature to devise a thermal comfort rating system as part of a Tourism Climatic Index. The thermal comfort rating system used a nomogram to calculate effective temperature on the basis of dry bulb temperature and relative humidity. Scores up to a maximum of 5.0 were attributed by Mieczkowski (1985), to these effective temperatures with the optimum corresponding to thermal neutrality. Mieczkowski's (1985) system was based on climatic conditions for tourist activities such as sightseeing, but the recommendation was made that for sedentary beach

activities the rating scale should be shifted by one unit to the right (i.e. higher effective temperatures), to reflect the different thermal requirements. This modification was applied to the nomogram used in this study (Fig. 5.1), for relating effective temperatures (calculated from published data on relative humidity and average daily maximum temperature), to expressed preferences for thermal sensations. The thermal sensations were listed on the questionnaire as "very hot", "hot", "warm", "neither cold nor warm", "cool" and "cold". From the nomogram (Fig. 5.1), the digits 1 and 2 at the "high temperature" end of the scale corresponded to the thermal sensation "very hot", 3 and 4 corresponded to "hot", 5 corresponded to "warm", 4 and 3 at the "cold" end of the scale corresponded to "neither cold nor warm", 2 and 1 corresponded to "cool" and 0 to "cold".

Beach scores for temperature sensation were calculated as follows. Firstly, scores for each thermal sensation were computed for beach users preferring each beach type, as described in Chapter 5.7.3. Meteorological data for each month from May to September in terms of average daily maximum temperatures was used in conjunction with the nomogram. For the first month (May), the data was used to read off a digit from 1 to 5 for that month. The preference score corresponding to that digit (and hence corresponding to a thermal sensation as described above), would then be the "thermal sensation score" for that month, for beaches of the particular type, closest to that meteorological station. This process was then repeated for June, July, August and September. The mean for the five "thermal sensation scores" (one for each month), was then calculated; this applied to all beaches of the particular type, closest to that meteorological station. This process was repeated for each meteorological station's data, successively using the beach user preference scores for thermal sensation for those users preferring each type of beach.

Key to Digits on Diagonal Axis of Nomogram (from left to right)	
Nomogram Digit	Questionnaire Preference
0	cold
1,2	cool
3,4	neither cold nor warm
5	warm
4,3	hot
2,1	very hot

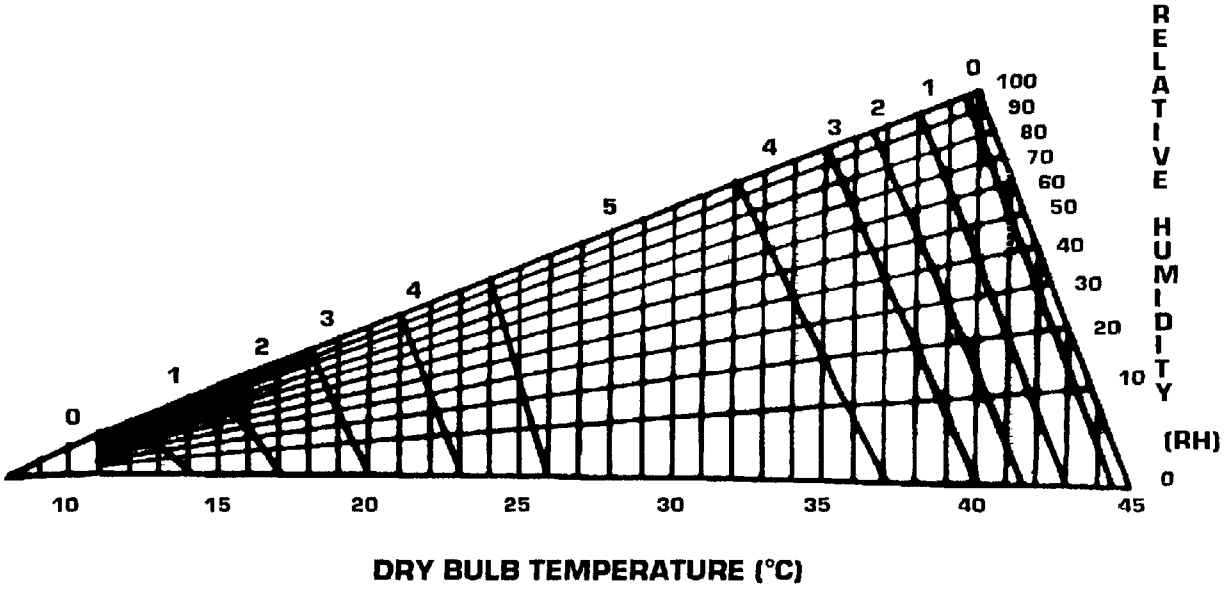


Fig. 5.1 Temperature Sensation Nomogram (modified from Mieczkowski (1985))

With regard to precipitation, Mieczkowski (1985) attributed point values to 11 categories of monthly precipitation amount, ranging from a maximum score for 0 - 14.9 mm of precipitation to zero for more than 150 mm. De Freitas (1990) considered that precipitation should be regarded as essentially binary data, i.e. occurrence/non-occurrence rather than in terms of amount of precipitation. However, most meteorological precipitation data is given in terms of amount rather than duration, so there was little alternative but to employ this method of measurement in this case. The scale of Mieczkowski was therefore employed without modification (Table 5.7).

Mean monthly precipitation (mm)	Score	Mean monthly precipitation (mm)	Score
<15	(max. score)	90 - 105	0.4 x max. score
15 - 30	0.9 x max. score	105 - 120	0.3 x max. score
30 - 45	0.8 x max. score	120 - 135	0.2 x max. score
45 - 60	0.7 x max. score	135 - 150	0.1 x max. score
60 - 75	0.6 x max. score	>150	(zero)
75 - 90	0.5 x max. score		

Table 5.7 Precipitation Scale Used in Final Checklist

Mieczkowski (1985) also attributed point values to data concerning mean monthly hours of sunshine per day. A maximum score was given for 10 hours or more of sunshine per day, declining linearly to zero for less than one hour of sunshine. This scale was employed for this study (Table 5.8).

Wind is a complicated factor to evaluate for leisure climate assessment. Wind accelerates the transfer of heat by turbulence and evaporative cooling. At low temperatures, wind increases the chill sensation by removing the heated layer of air next to the skin, while at warmer temperatures (25 - 33°C) it cools the body by the same action. When air temperature exceeds the comfortable skin temperature of 33°C, wind increases the heat load and discomfort by adding convective heat to the body (Mieczkowski, 1985). As far as climatic conditions in Wales (and indeed the rest of the UK) are concerned, monthly average daily

maximum temperatures at the coast rarely exceed 25°C, justifying the use of a scale where the lowest mean monthly wind speeds are assigned an optimum value. This is similar to the "normal system" adopted by Mieczkowski (1985) for this variable.

Mean monthly hours of sunshine per day	Score	Mean monthly hours of sunshine per day	Score
>10	(max. score)	4 - 5	0.4 x max. score
9 - 10	0.9 x max. score	3 - 4	0.3 x max. score
8 - 9	0.8 x max. score	2 - 3	0.2 x max. score
7 - 8	0.7 x max. score	1 - 2	0.1 x max. score
6 - 7	0.6 x max. score	<1	(zero)
5 - 6	0.5 x max. score		

Table 5.8 Sunshine Duration Scale Used in Final Checklist

For the beach user, the occurrence of high wind can cause annoyance in terms of disruption of personal belongings (so that they have to be secured or weighted down) and indirect effects of blowing sand. De Freitas (1990) found that high winds (particularly above 4 ms^{-1}), detracted from the enjoyment of beach leisure. The main contributing factor was blowing sand, with saltation of typical sand grains (0.21 - 0.25 mm) beginning at a wind speed of 5.6 ms^{-1}. This supports the opinion of Danilova (1976), who regarded winds above 6 ms^{-1} as uncomfortable in any weather conditions. This wind speed "ceiling" of approximately 6 ms^{-1} for beach user comfort was taken into account in modifying the wind speed scoring scale for use in this study. The final scale for monthly average daily maximum temperatures not exceeding 25°C (which applied to the main study in Wales), used similar scale divisions to that of Mieczkowski (1985) with an optimum score for wind speeds below 0.8 ms^{-1}, decreasing in stepwise fashion to a score of zero for wind speeds of more than 6 ms^{-1}.

For higher temperature ranges (monthly average daily maximum temperatures of 25 - 33°C), a scale similar to Mieczkowski's (1985) "trade wind system" was used with the optimum score set at a moderate wind speed of 2.5 -

3.4 ms^{-1} again decreasing to zero for speeds above 6 ms^{-1}. Finally, for monthly average daily maximum temperatures exceeding 33°C, a scale similar to Mieczkowski's (1985) "hot climate system" was used with the optimum value at the lowest wind speed, but only 40% as high as with the other scales. These latter two scales were applied only to the data relevant to the pilot beach rating study in Turkey (Chapter 7), where higher monthly average daily maximum temperatures made their use appropriate. The three scales are shown in Tables 5.9 to 5.11.

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	(max. score)	2.5 - 3.4	0.4 x max. score
0.8 - 1.6	0.8 x max. score	3.5 - 6.0	0.2 x max. score
1.6 - 2.5	0.6 x max. score	>6.0	(zero)

Table 5.9 Wind Speed Scale Used for Study in Wales

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	0.4 x max. score	2.5 - 3.4	max. score
0.8 - 1.6	0.6 x max. score	3.5 - 6.0	0.5 x max. score
1.6 - 2.5	0.8 x max. score	>6.0	(zero)

Table 5.10 Wind Speed Scale for Temperatures of 25 - 33°C

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	0.4 x max. score	2.5 - 3.4	0.1 x max. score
0.8 - 1.6	0.3 x max. score	3.5 - 6.0	(zero)
1.6 - 2.5	0.2 x max. score	>6.0	(zero)

Table 5.11 Wind Speed Scale for Temperatures Above 33°C

For the parameters of sunshine hours, precipitation and wind speed, scores were calculated separately for each month partly or wholly included in the officially defined EC Bathing Season (i.e., May - September), based on data supplied by the nearest coastal meteorological station to the beaches to be considered (see Appendix 15). Data was in terms of mean monthly averages over a period of a large number of years (often decades; Table 5.12), enabling a picture to be obtained of the "typical" climate in the relevant coastal area for a particular month.

Coastal met. station	No. of years of climate data available
Rhoose (51 24 N, 3 20 W)	35
Aberporth (52 08 N, 4 34 W)	34
Valley (53 15 N, 4 32 W)	62

Table 5.12 Coastal Meteorological Stations from which Climate Data Gathered

Mean scores for each of the four climate parameters for each month were computed. The average score for the five months of May to September for each parameter, was then calculated.

5.6 Calculation of Bathing Safety Index

The priority given by beach users to bathing water safety (the Bathing Safety Index featured on the checklist), was calculated in an indirect fashion. The sum was calculated from the questionnaire, of 4 beach user priority scores relating to the beach's intrinsic characteristics with regard to safe bathing (i.e. excluding lifeguard provision). These were questions relating to strong currents, dangerous undertows (rip currents), large waves and rapid increase in depth when wading into the water.

Scores for individual beaches were calculated on the basis of wave height (as observed at the time of beach checklist assessment) and beach morphology

(as assessed from the beach video panoramas), using a table modified from that of Short (1993). Short's (1993) work was carried out on Australian microtidal sand beaches, so it was not completely appropriate to use the original table for the macrotidal conditions of the Welsh coast. The table used for this work (Table 5.13) condensed Short's (1993) original six categories of beach morphology to three; dissipative, intermediate/low tide terrace (LTT) and reflective. "Intermediate" beaches may be classified as both dissipative and reflective, depending on the tide state.

Wave Height (m) / Beach Type	<0.5	0.5	1.0	1.5	2.0	2.5	3.0	>3.0
Dissipative	4	5	6	7	8	9	10	10
Intermediate/LTT	3	3	4	5	6	7	8	10
Reflective	2	3	4	5	6	7	8	10

Table 5.13 Beach Safety Scale (Modified from Short, 1993)

Typical examples of each of the three main types amongst the beaches included in this study were:

Reflective - St. Mary's Well Bay

Intermediate - Southerndown

Dissipative - Whitmore Bay (Barry), Aberafan.

In the context of this study, low tide terraces were always present on rocky beaches, where the beach material (if any), was inevitably gravel. However, a **small** amount of gravel has no appreciable effect on waves, e.g. Kinmel Bay, Rhossili. In a macrotidal context, total extension is very important since the amount of time spent at the gravel ridge (which inevitably marks the backward extent of the beach), is usually small in comparison to the duration of the whole tidal cycle. This means that most sand extents are essentially dissipative in nature

but the beach could become reflective at the high tide position if enough gravels occur, e.g. at Southerndown. Several instances were found of an extremely thin veneer of gravel/sand so that the intertidal area is essentially a low tide terrace, e.g. Llantwit. An important consideration is the amount of gravel required at the edge of the beach for reflective conditions to occur. Several instances of gravel deposits were seen but they appeared to be small and it was difficult to fit these into the scheme used.

Effect of Structures (Sea Walls and Groynes) on System

Stepped structures e.g. at Aberafan are built in order to dissipate wave energy; vertical structures (e.g. Cricceith), will cause reflection and clapotis of the waves. It would seem that groynes do not have appreciable significance with regard to changing conditions from dissipative to reflective and vice versa.

Presence/Absence of Ridge/Runnel Phenomena

It is suggested that presence of ridges and runnels would be important in any classification of beaches in macrotidal areas, but further work would be required to fit them into a scheme of this type.

In conclusion it can be said that more work is needed with respect to consideration of the whole tidal cycle in macrotidal areas, the presence/absence of structures such as sea walls/groynes, and mixed sediment beaches.

In Short's (1993) original table, a high score (out of a maximum of 10), equated to a high level of danger and this orientation was maintained in the modified version used in this study (Table 5.13). As a high score was undesirable for this aspect (in contrast to scores for all the other aspects featured in the checklist), the score for "bathing safety" was subtracted when totalling the checklist score for a beach. The assessment of beaches is given in Table 5.14, with the beaches in the same order as in the beach scenery assessment video tape.

Beach	D - dissipative R - reflective I - intermediate LTT - low tide terrace	Structures: g - groynes s - sea wall	Beach	D - dissipative R - reflective I - intermediate LTT - low tide terrace	Structures: g - groynes s - sea wall
Nash	R		Llandudno (North Beach)	D	s, g
Kinmel Bay	D	s,g	Caswell	D	
Mwnt	D		Ogmore	D	
Llangranog	D		Manorbier	D	
Rhosneigr (Traeth Llydan)	D		Cold Knap	R	
Barry (Jackson's Bay)	D		Oxwich	D	
Rhosneigr (North Beach)	D	s	Pwllheli	R	
Barafundle	D		Aberystwyth (N. Beach)	I	
Broad Haven	D	s	Whitesands	D	s
Southerndown	I		Aberdyfi	D	
Amroth	I		Colwyn Bay	D	s, g
Langland	D	s	Bracelet	LTT	
Aberafan	D	s	St. Mary's Well Bay	LTT	
Cricceith	D	s	Rhossili	D	
Prestatyn	D	s	Morfa Bychan	D	
Swansea Bay	D	s	Mumbles	D	s
Porthcawl (Sandy Bay)	D	s	Freshwater East	D	
Rest Bay	D		Llandudno (West Beach)	D	
Tywyn	D	s	Newport	D	
Poppit Sands	D	s,g	Pendine	D	s
Caerfai	D		New Quay	D	
Porthcawl (Newton)	D		Barry (Whitmore)	D	s
Newgale	D	half s	Rhyl	D	s, g
Saundersfoot	D	s	Marloes	D	
Port Eynon	D	half s	Aberystwyth (South)	R	s
Abersoch	D		Treaddur Bay	D	s
Abereiddi	I	s	Porthcawl (Trecco Bay)	D	half s
Pembray	D		Benllech	D	s
Llandanwg	D		Dinas Dinlli	R	
Three Cliffs Bay	D		Wiseman's Bridge	R	
Lydstep	I	s	Harlech	D	
Broadhaven (South)	D		Tenby (South Beach)	D	
Llantwit	LTT/R		Barmouth	D	
Fairbourne	I		Borth	D	s, g
Aberaeron	LTT/R	g	Tenby (North Beach)	D	s

Table 5.14 Assessment of Beach Morphology

5.7 Questionnaire Data Processing

5.7.1 Introduction

Questionnaire responses in terms of beach user preferences and priorities for the various beach aspects, etc, required a structured sequence of data processing steps in order to convert them into a format suitable for attributing scores to beach features appearing on the checklist. The software package "SPSS for Windows, version 6.0" (Norusis, 1993), provided a suitable system for entering raw questionnaire data, performing the required data processing steps and later analysis of survey data.

5.7.2 Selection of Questionnaires for Processing

Following the questionnaire survey, questionnaires were carefully inspected to check that they had been satisfactorily and completely filled in. Inspection showed that some questionnaires had not been fully completed. Also, it was noted that in some cases, Part 3 (priority rating on the 1 to 5 scale) had been filled in by habitually circling the same number for long sequences of questions. This invariably applied to the numbers "1", "3" and "5" on the scale (Appendix 10). In order to maintain the quality of the beach user preference/priority data base required by the study, it was decided to eliminate such cases from data analysis for the purposes of calculating beach user preferences and priorities.

As far as incomplete questionnaires were concerned, those with 10 or more uncompleted questions in Part 3 were eliminated. Also eliminated were those where preferred beach type had not been stated and those where Part 4 (ranking of the 5 broad-based facets of the beach environment), had not been completed. For repetitive completion of Part 3, those questionnaires where 10 or more questions in succession had been answered by circling the same number were excluded. Finally, those questionnaires where the highest priority end of the scale

in Part 3 (either "1" or "5", depending on question orientation), had been circled 10 or more times in succession, were excluded.

The total number of questionnaires excluded from preference/priority calculation for beach rating purposes was 145 out of the original 1,004 questionnaires. Eight hundred and fifty nine questionnaire responses therefore remained for beach rating purposes. For purposes of analysis regarding socio-demographic parameters of beach users in Wales, these questionnaires were still included where this information was complete. Only 16 questionnaires were completely excluded from any data analysis. A breakdown of this data was given in Table 5.14.

5.7.3 Data Processing Stages to Score Checklist

All variables used in SPSS must be given code names of not more than 8 letters/digits in length and each variable (whether it is a variable for which data is entered directly, or one for which a value is calculated by further computation), must have a separate and distinct name. In order to clarify the later data processing stages, each questionnaire question (in the case of priority ratings on the 1 to 5 scale) was first given a variable name of "PR" followed by 4 letters (PRXXXX), thereby allowing additional letters and/or digits to be added to the original variable name during the sequence of data processing stages. Questions in Part 2 of the questionnaire required a preference selection for a number of options for that beach aspect, e.g. preferred sand colour. These were first coded with 4 letters followed by a number (XXXXn), with n = 1 for the first option listed on the questionnaire, n = 2 for the second listed option, etc. Entered values for all these "XXXXn" variables were recoded into new variables (X1XXXn), the nature of the recoding depending on the number of preference options available for that question, as shown below:

Number of Preference Options Available for Question		
4, 5 or 6 options	**3 options**	**2 options**
1 recoded to 1	1 recoded to 1	1 recoded to 1
2 recoded to 0.6666	2 recoded to 0.5	2 recoded to 0
3 recoded to 0.3333	3 recoded to 0	0 recoded to 0
4 recoded to 0	0 recoded to 0	
5 recoded to 0		
6 recoded to 0		
0 recoded to 0		

The result of this recoding was that all X1XXXn variables had values of between 0 and 1 for all questionnaire responses. The preference option given first preference by a beach user for a particular aspect (originally entered with n = 1 in the XXXXn variable), now had the highest numerical value for preference in the corresponding X1XXXn variable, while second, third, etc, preferences were recoded to lower numerical values. As can be seen, no preference lower than third by any individual beach user, was taken into account for any beach aspect.

Values for variables in Part 3 of the questionnaire ("PRXXXX", for priorities on a 1 to 5 scale), were entered and recoded into new variables ("P1RXXXX"). Since the original variables were randomly orientated in terms of the highest priority being on the left or the right (i.e. either 1 or 5 on the 5-point scale), the recoding varied as shown below:

Highest priority at "5" end of 1 to 5 scale:

1 recoded to 0
2 recoded to 1
3 recoded to 2
4 recoded to 3
5 recoded to 4

Highest priority at "1" end of 1 to 5 scale:

5 recoded to 0
4 recoded to 1
3 recoded to 2
2 recoded to 3
1 recoded to 4

As a result of the recoding, each P1RXXXX variable had a value between 0 and 4 for each aspect, for each beach user. Those aspects given highest priority by the beach user now had the highest numerical value (4), for the new variable, while those given the lowest priority had a value of zero.

The next stage was to create a variable which was the mean of the values of all P1RXXXX variables, for each client. This variable was given the name "MEANPR". Use of this variable, the value of which would be different for each beach user, allowed correction to be made to the values of the P1RXXXX variables to account for the fact that some beach users tended to give mainly "high" prioritising scores to Part 3 questions, while other beach users tended to give mostly "low" prioritising scores. Without correcting for this tendency, beach users tending to give mainly "high" scores would make a disproportionately large contribution to the final beach user priority indices (and hence scoring of beach checklists), compared to those giving mainly low scores. Correction was carried out by dividing the value of each P1RXXXX variable for each beach user, by the value for MEANPR for that beach user, creating new variables "P2RXXXX", where in each case:

$$P2RXXXX = P1RXXXX/MEANPR$$

Values for these P2RXXXX variables now constituted priority values for those beach aspects for which beach user preference was assumed, i.e. those for which preference selection was not included in the questionnaire. A mean value

could now be calculated for each of these modified preference variables, for all those beach users stating they preferred to visit each of the five beach types.

Each calculated mean value could be applied directly to the appropriate location in a "blank" checklist, to be used to score beaches of that particular type with regard to commercialisation (Appendices 16 to 19). The calculated mean of these P2RXXXX values was placed into a location on the "blank" checklist which was the optimum for that particular beach aspect, e.g. for litter "none present", for toilets "clean". For the other, non-optimum categories for each beach aspect, values were calculated as a proportion of the "optimum condition" value such that the "least desirable" category scored zero, with scores for intermediate categories spaced out proportionately. For example, for aspects with 4 categories such as cleanliness of toilets, if the category "very clean" received a score of 1.39:

"Very clean":	score =	1.39
"Slightly dirty":	score = 1.39 x 0.666 =	0.93
"Quite dirty":	score = 1.39 x 0.333 =	0.46
"Extremely filthy":	score =	0.00 (zero)

For those beach aspects where the preference for the various categories was derived from questionnaire responses rather than assumed, the corrected priority scores (P2RXXXX scores), needed to be related to the appropriate recoded preference scores (X1XXXn scores), for each beach user. This produced a combined preference/priority score, "CXXXXn", calculated by multiplying each beach users' preference score for that aspects' category by the corresponding priority score:

CXXXXn = P2RXXXX (multiplied by) X1XXXn

The mean value was calculated for each of these CXXXXn variables, for all beach users stating they preferred to visit each of the five beach types. Again, each calculated mean value could be applied directly to the appropriate location in

a "blank" checklist, for scoring beaches of that particular type with regard to commercialisation (Appendices 16 - 19). A worked example showing all the above data processing stages is given in Appendix 20.

5.7.4 Further Data Analysis

As with the GHC study, beach users were classified by stated occupation. At the time this process was carried out (1994/5), the original definition of "socio-economic status" had been replaced by one of "Social Class" (Office of Population Censuses and Surveys; OPCS, 1991), although the classification of occupations into categories remained essentially the same. Occupation classifications listed by the OPCS (1991), were used. Students were given a code of 6, unemployed persons and housewives 7, and retired persons 8.

Data was processed to test for significant correlations between a wide range of client preference and priority parameters, both in relation to each other and with socio-demographic variables. Non-parametric tests (Mann-Whitney U, Kolmogorov-Smirnov, Kruskal-Wallis) were performed to examine the significance of differences in data values obtained for all parameters, between beach users stating a preference for visiting various beach types (in terms of level of commercialisation), between males and females, and other selected groupings.

Multiple regression analysis of data was carried out in two stages. In the first stage, the dependent beach user variables included were age, gender, distance travelled on day of interview, planned length of stay, preferred beach type and place of origin. All these dependent variables were ordinal except for gender (a bivariate variable, where males were coded as 1 and females as 2). Place of origin could be regarded as an ordinal variable since it was coded in terms of increasing geo-political distance from Wales, the site of the study. Codings given were; Wales = 1, Rest of UK = 2, Other EC countries = 3, non-EC = 4. Social class could not be included as a dependent variable because of the inclusion of students, housewives, retired and unemployed persons in categories outside the

ordinal segment of the classification system (social classes 1 to 5). A second stage of multiple regression analysis was therefore carried out where social class was included among the dependent variables, with only employed beach users (those falling within the ordinal social class categories of 1 to 5), included.

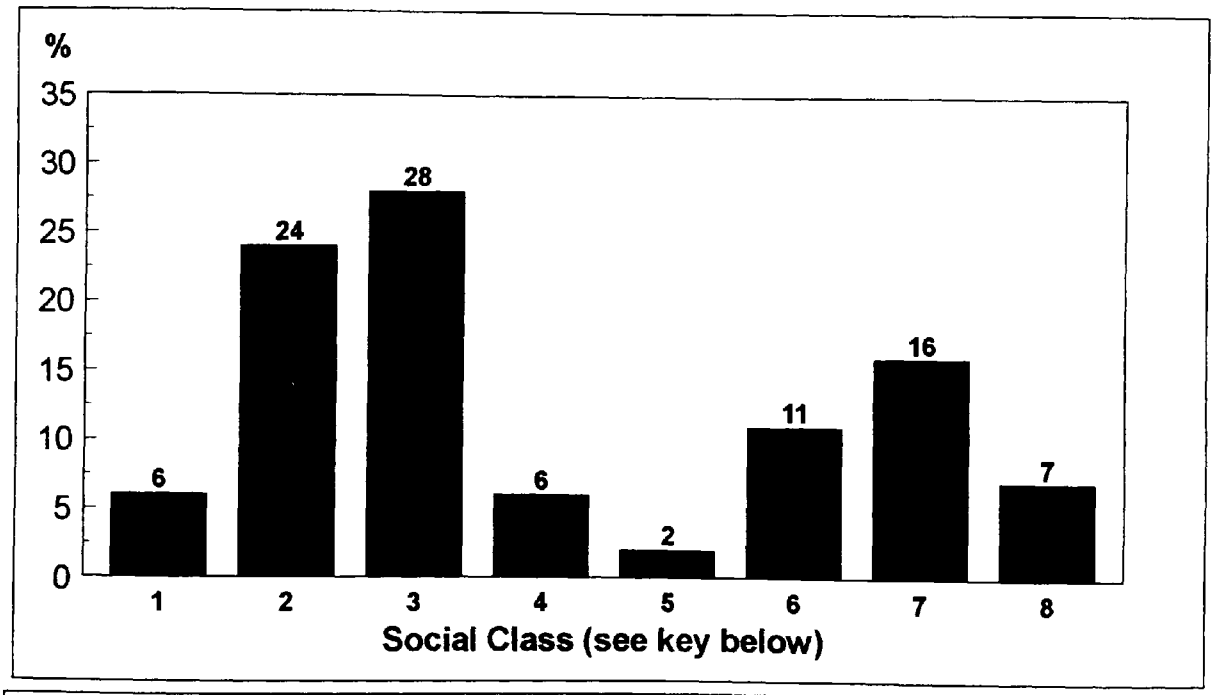
CHAPTER 6

MAIN STUDY - RESULTS AND DISCUSSION

6.1 Socio-Demographics

Social Class

By far the largest proportion of employed beach users (n = 558; 66%) fell into social classes 2 and 3 (24% and 28% of the total number surveyed; n = 205, n = 240 respectively; Fig. 6.1). Six percent fell into social class 1. Classes 4 and 5 together only accounted for 8% of those surveyed.



Key to Fig. 6.1			
Description	Social Class	Description	Social Class
Professional Occupations	1	Unskilled Occupations	5
Intermediate Occupations	2	Students	6
Skilled Occupations	3	Unemployed, housewives	7
Partly Skilled Occupations	4	Retired	8

Fig. 6.1 Social Class of Beach Users in Main Study Survey (based on OPCS, 1991)

Distance Travelled to the Survey Beaches

Almost half of those surveyed (47.9%; Fig. 6.2), said that they had travelled less than 10 miles to the beach on which they were interviewed, on that day. Only 13% had travelled 45 miles or more. For those travelling from their own home or friends/relatives homes to the beach, this suggests that convenience in terms of travelling distance could be a significant determinant of beach choice, in accord with the findings of Cutter *et al.*, (1979).

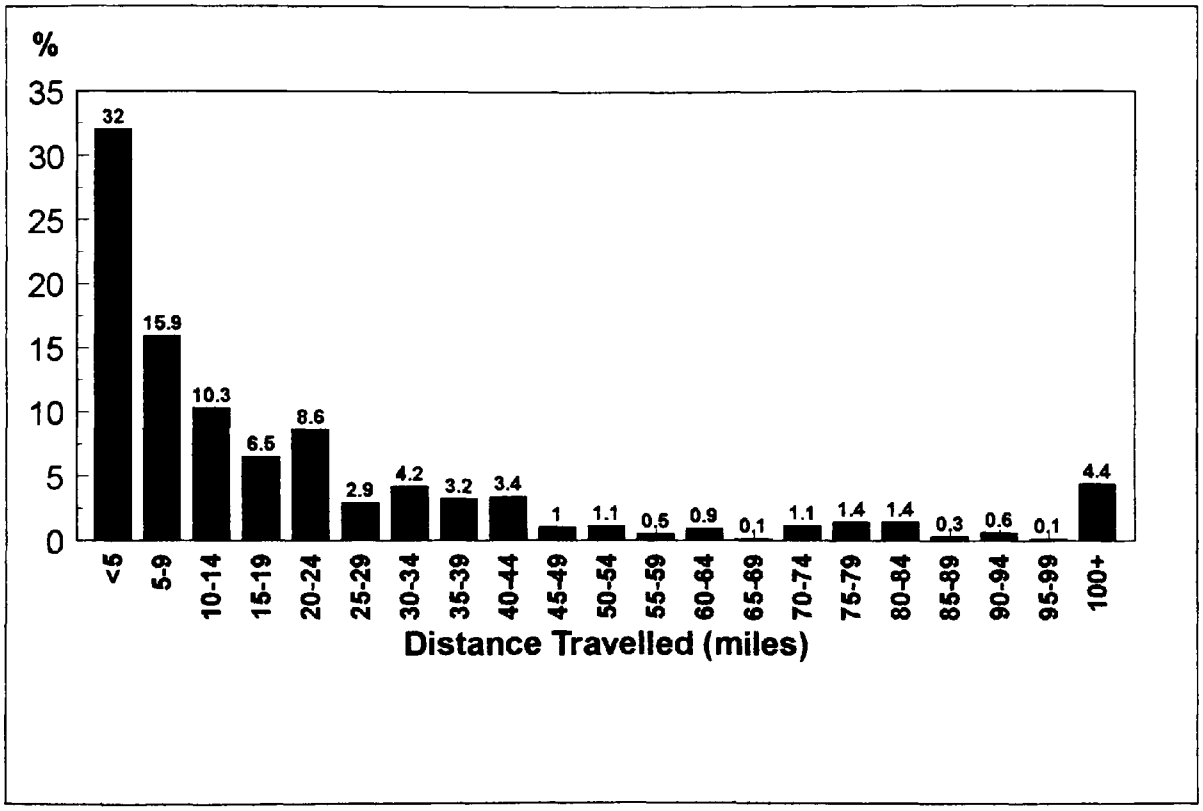


Fig. 6.2 Distance Travelled to Beach by Users on Day Surveyed

Place of Origin

Just over half of those interviewed (53%; Fig. 6.3), lived in Wales, with 45% originating from the remainder of the UK, overwhelmingly (44%) from England. Only 2% were from other EC countries, and a single beach user in the study lived outside the EC. These figures emphasise the importance of beach visitors from

England to Welsh coastal tourism, while implying that overseas visitors have yet to be attracted in large numbers to Welsh beaches.

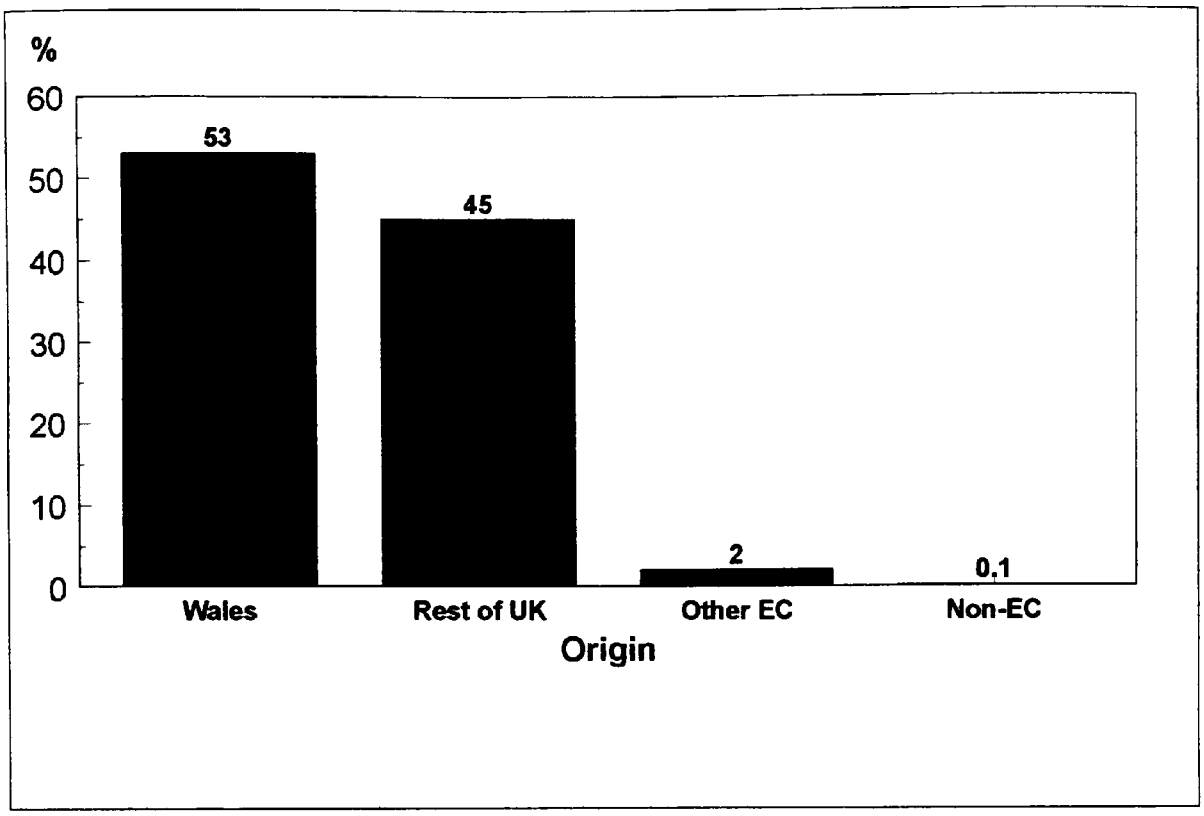


Fig. 6.3 Origin of Beach Users in Main Study

Type of Accommodation

It was notable that the traditional hotel/bed and breakfast/guest house sector accounted for only 8% of beach users' accommodation in this study (Fig. 6.4). This sector was easily outstripped by self-catering accommodation (19%). Twenty five percent of accommodation was provided by caravans, camping and motorhomes. Unfortunately, static caravans which make up a large proportion of the holiday accommodation provision on many parts of the Welsh coast, were not distinguished from touring caravans in this study. Even so, this sector of "mobile accommodation" can be seen to be an important contributor to the Welsh beach holiday scene. Forty seven percent of those surveyed were completely outside the commercial sector as far as accommodation was concerned, either being day visitors travelling from their own home, or staying with friends/relatives.

For beach users whose home address was outside Wales, the hotel/bed and breakfast/guest house sector still only accounted for 11% of accommodation, the same percentage as accommodation in the homes of friends and relatives. This compared to 31% for self-catering accommodation and 38% by caravans, camping and motorhomes for such visitors.

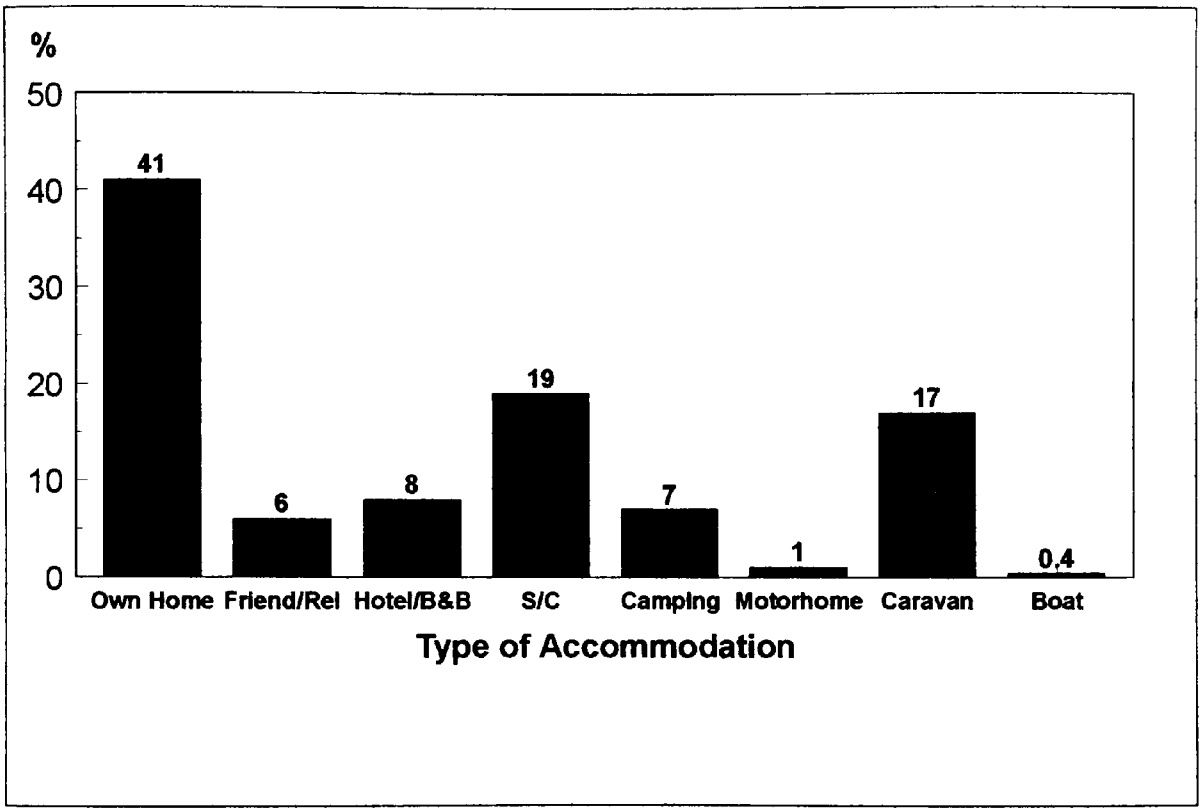


Fig. 6.4 Type of Accommodation Used by Beach Users

Age

When examining the distribution of ages of beach users interviewed, the shortcomings of the beach user questionnaire survey methodology should be borne in mind. In the survey, an attempt was made to achieve an approximation of a stratified sample with regard to age and sex of adult (or near adult) beach users, and also in terms of group size (individuals, couples, families, etc.). However, the age breakdown of beach users surveyed in this study, cannot necessarily be taken as representative of the adult Welsh beach using population in total.

More than half those interviewed were aged between 25 and 44 years (Fig. 6.5). Five percent were under 18 (the youngest interviewee being 10 years old), and 4% were 65 or over (the oldest interviewee being 82 years old).

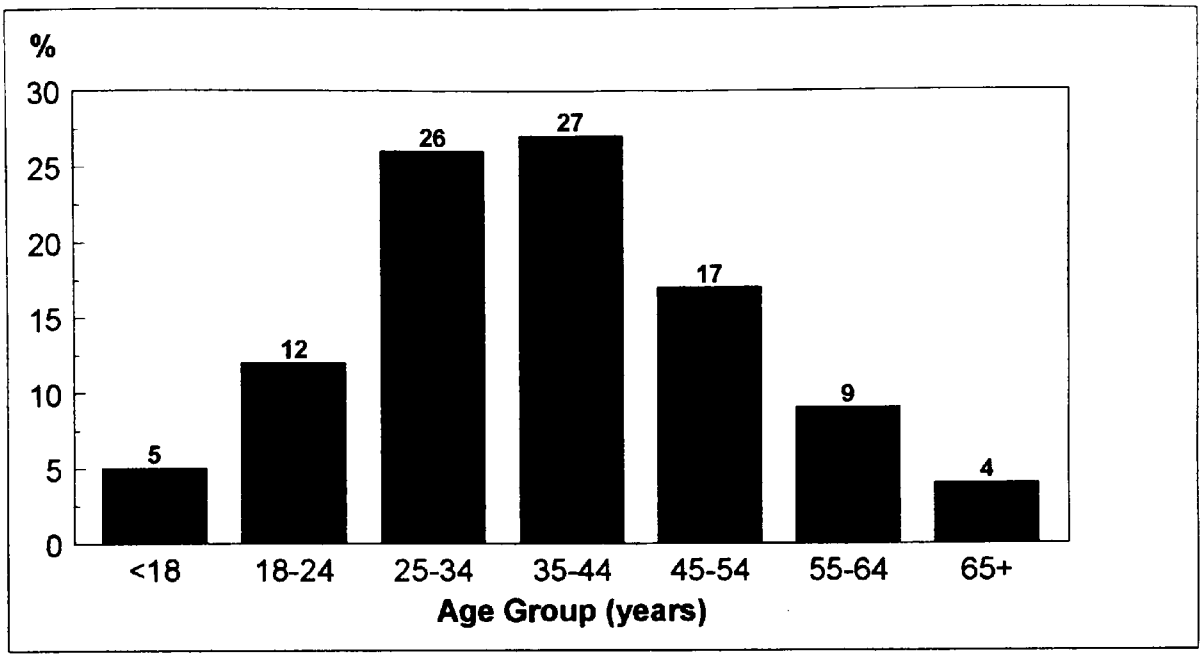


Fig. 6.5 Age Breakdown of Main Study Interviewees

Planned Length of Stay

The modal planned length of stay of beach users in this study was 4 hours (Fig. 6.6), with a mean of 5.2 hours. Beach managers should bear in mind beach users' planned length of stay when considering provision of facilities, especially those such as toilets and refreshments.

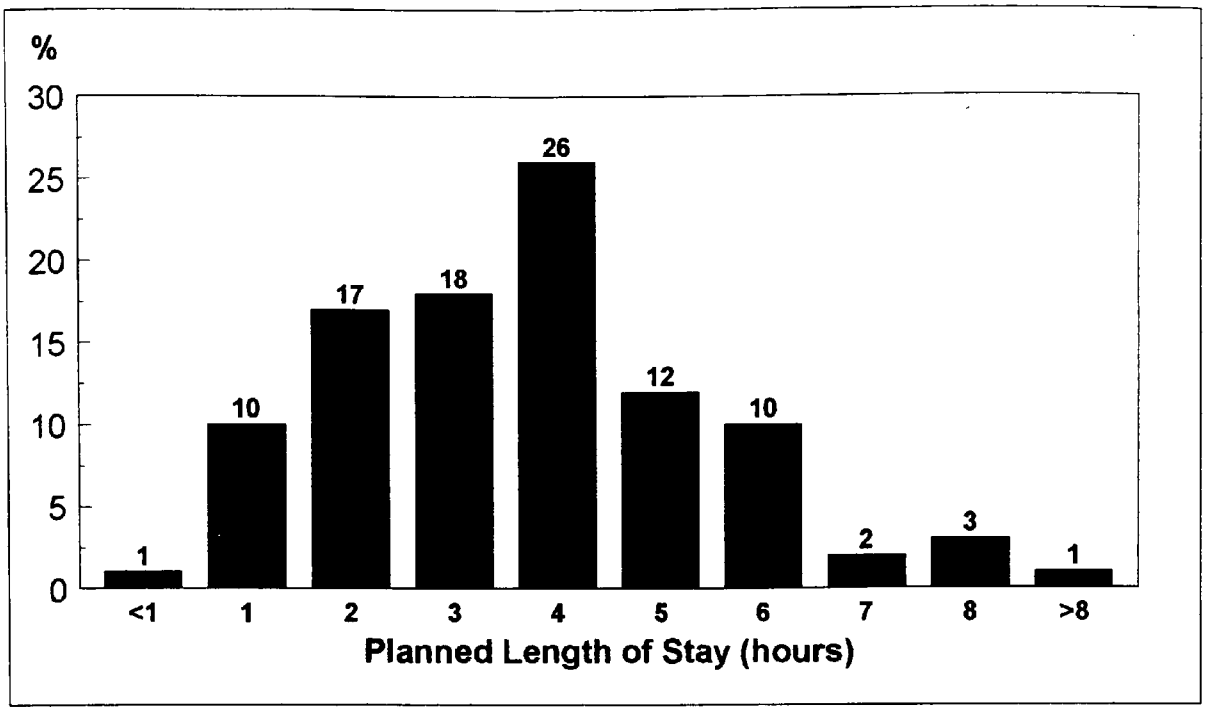


Fig. 6.6 Planned Length of Stay of Beach Users in Main Study

Preferred Type of Beach

Fig. 6.7 shows the breakdown of beach users' stated preferred beach type, according to the descriptions given on the questionnaire (Appendix 10), and described in Chapter 5.3.2. Surprisingly, only 2.6% (n = 22) of those interviewed producing questionnaires suitable for rating purposes, stated a preference for visiting beaches at large resorts and only 6.2% (n = 53) for visiting beaches at medium-sized resorts. These numbers of beach users were so small that in order to produce a statistically satisfactory sample for checklist scoring and beach rating purposes, these two categories of preferred beach type were combined. This produced a beach user grouping of 75 preferring beaches at medium or large resorts. By far the largest number (n = 416, 48.4%), said they would prefer to visit a beach with only basic facilities (toilet, refreshment kiosk, car park).

As can be seen from Fig. 6.8, even people interviewed at large resort beaches often expressed preference for visiting beaches with only basic facilities or at small resorts. Indeed, visiting a beach with basic facilities was the most common preference for people surveyed at any category of beach apart from large

resorts, for whom it was the second most popular choice. This raises the question of why people who state a preference for beaches with basic facilities are to be found at medium/large resort beaches. One can suggest that there may be a conflict between the preference of the person actually filling in the questionnaire and the perceived needs of their family and/or children with regard to resort facilities. While the interviewee may wish to visit a beach with few facilities, they may feel (correctly or incorrectly), that their children or other companions desire more extensive commercial facilities that would not be present at such a beach. Knowledge of location and ease of access may be two further factors influencing this apparent conflict between actual beach choice and stated beach type preference. This is another aspect of the study calling for further elucidation by means of a more comprehensive study focused on this aspect, the results of which could have far reaching consequences for beach tourism promotion.

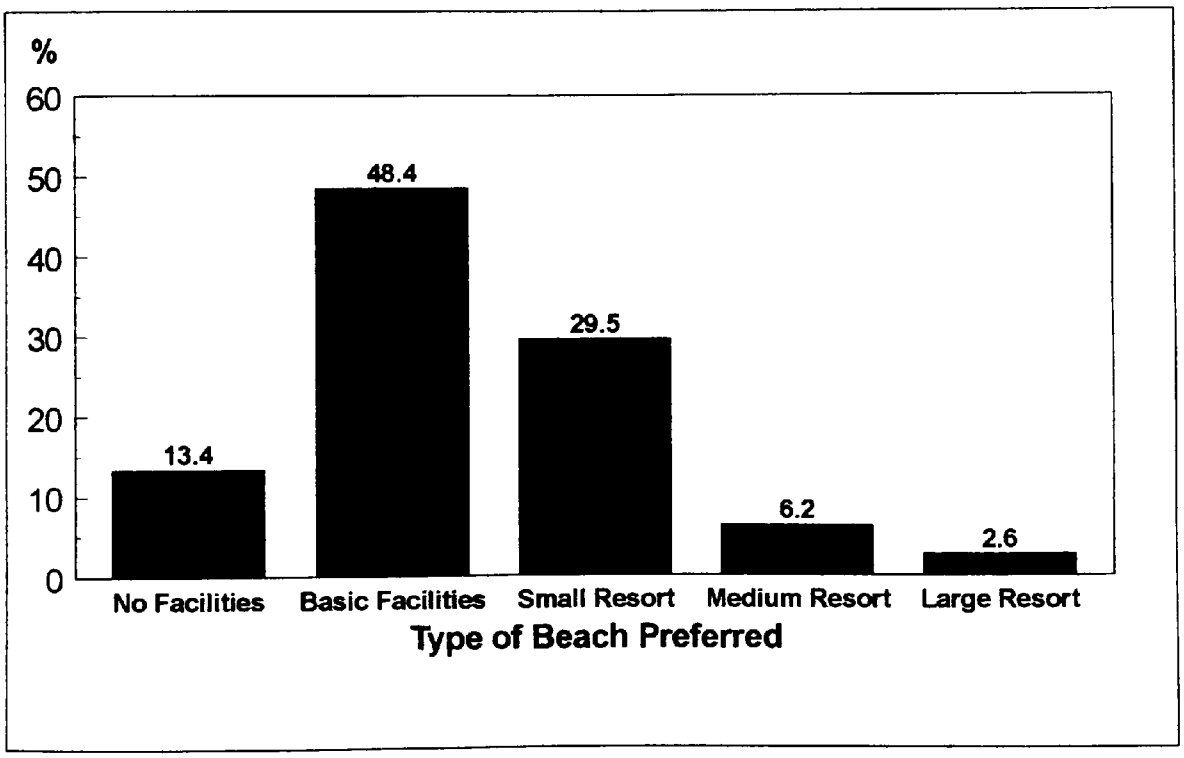


Fig. 6.7 Beach Users' Stated Preferred Beach Type

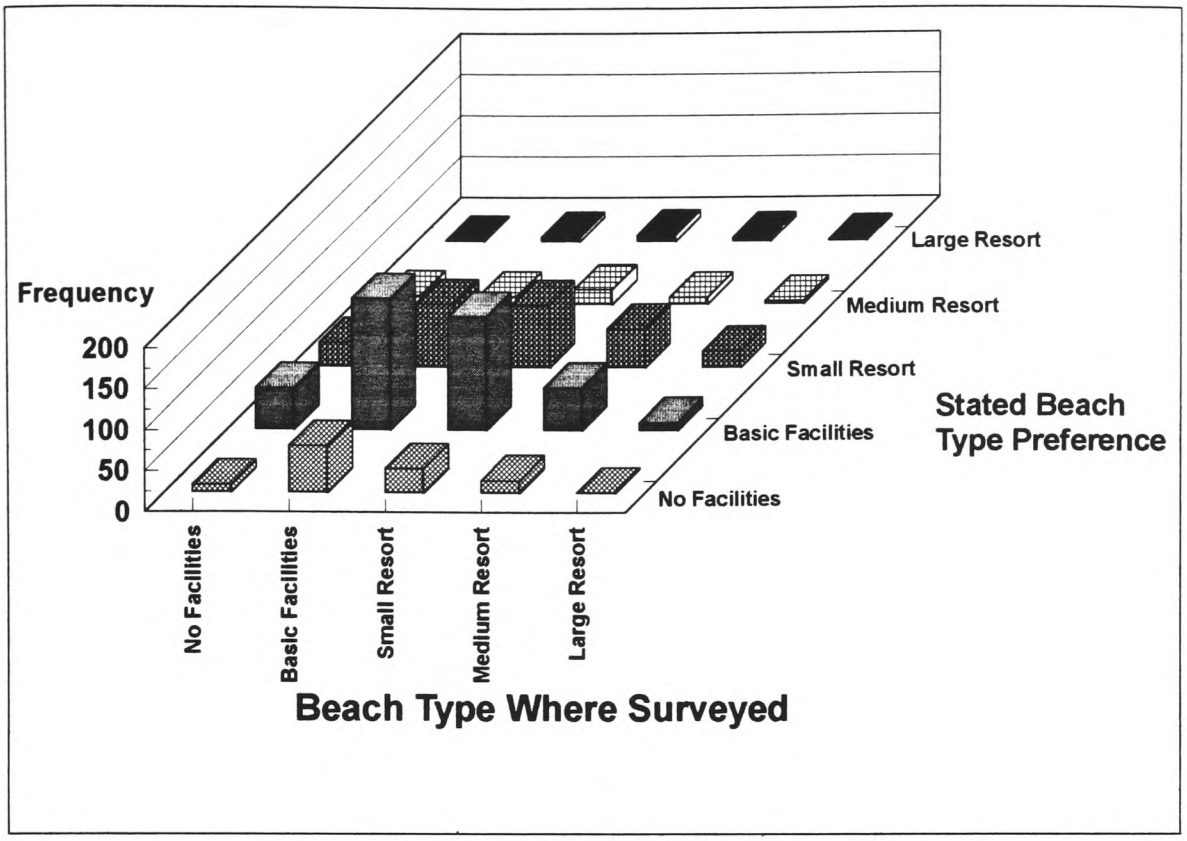


Fig. 6.8 Comparison of Preferred Beach Type Against Beach Type Where Interviewed

6.2 Preferences and Priorities

As stated in Chapter 5.7.3, mean beach user preferences and priorities were separated according to stated preferred beach type and transferred to "blank" checklist copies. These "blank" checklists (one for each of the four beach commercial classifications used, Appendices 16 to 19), once completed in this way formed a record of the percentages of the total beach rating score attributable to each category of each beach factor. A number of factors showed substantial differences in preference (with regard to categories) and/or priority (as percentage of total beach score), depending on preferred beach type.

6.2.1 Beach User Preferences

The questionnaire (Appendix 10), requested user preference selection for 19 beach factors. However post-survey consideration of the questionnaire in conjunction with the checklist (Appendix 13), resulted in one factor (amount/thickness of sand, generated by the question "I'd like the beach to have:

patchy sand with rocks sticking up/smooth, flat rock/lots of sand"), being discounted. This was because this factor had already been accounted for via the question "I'd like the beach to be made of: pebbles/gravel/sand/mud". Preferences for the 18 remaining factors are discussed below in the order in which they appear on the checklist.

Beach Width at Low Tide

Highest preference overall was for a width of 50 - 200 yards (approximately 50 - 200m; Fig. 6.9). This preference could be associated with the distance beach users would need to walk from the drier sand at the rear edge of the beach to reach the water. This factor could also be important in terms of observing the safety of children bathing in the sea, even though interviewees might not wish to enter the water themselves.

There were no striking variations in preference for low tide beach width according to preferred beach type.

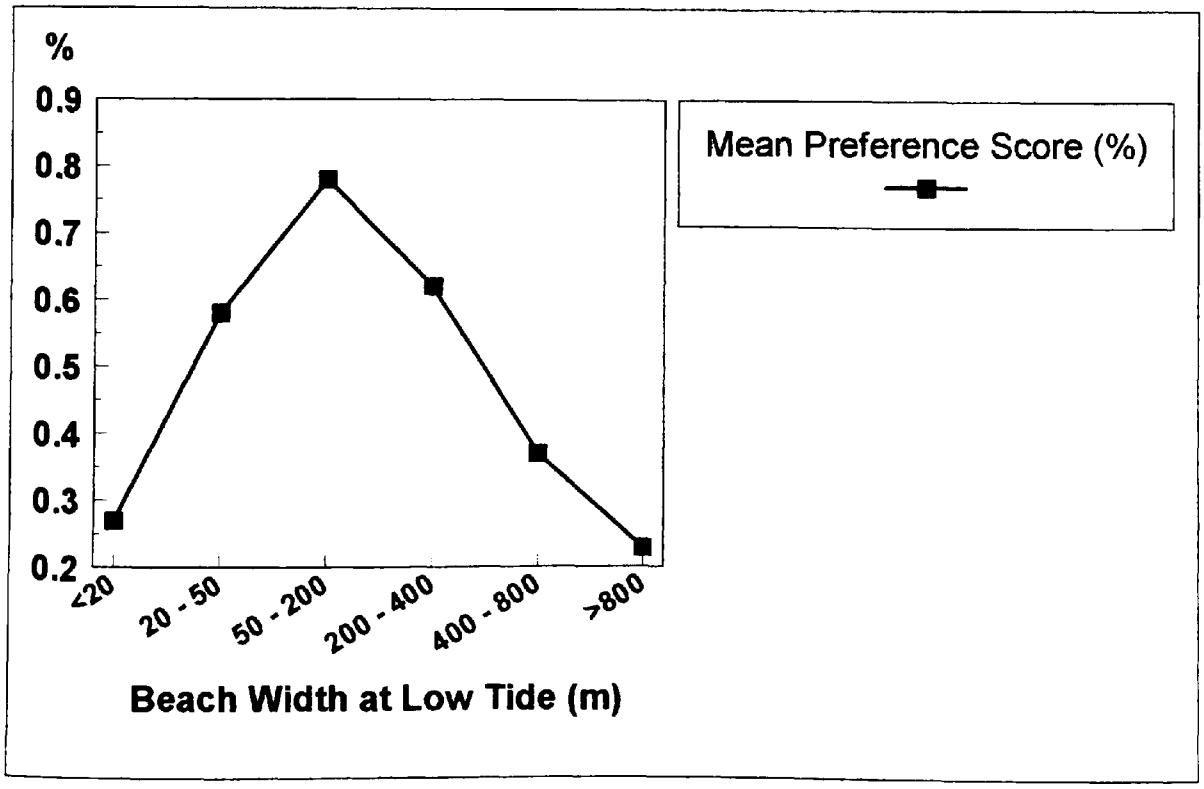


Fig. 6.9 Preference Scores for Low Tide Beach Width

Beach Width at High Tide

Highest preference was for a high tide beach width of 20 - 50 yards (20 - 50m; Fig. 6.10). Interestingly, the preference level for a beach width of <20m was twice as high (0.53% compared to 0.27% of total rating score), for high tide width compared to low tide. It could be that user preferences accord with their experience of UK (and especially Welsh) beaches where beach widths decrease markedly at high tide. Again, there were no striking trends in beach width preference related to preferred beach type.

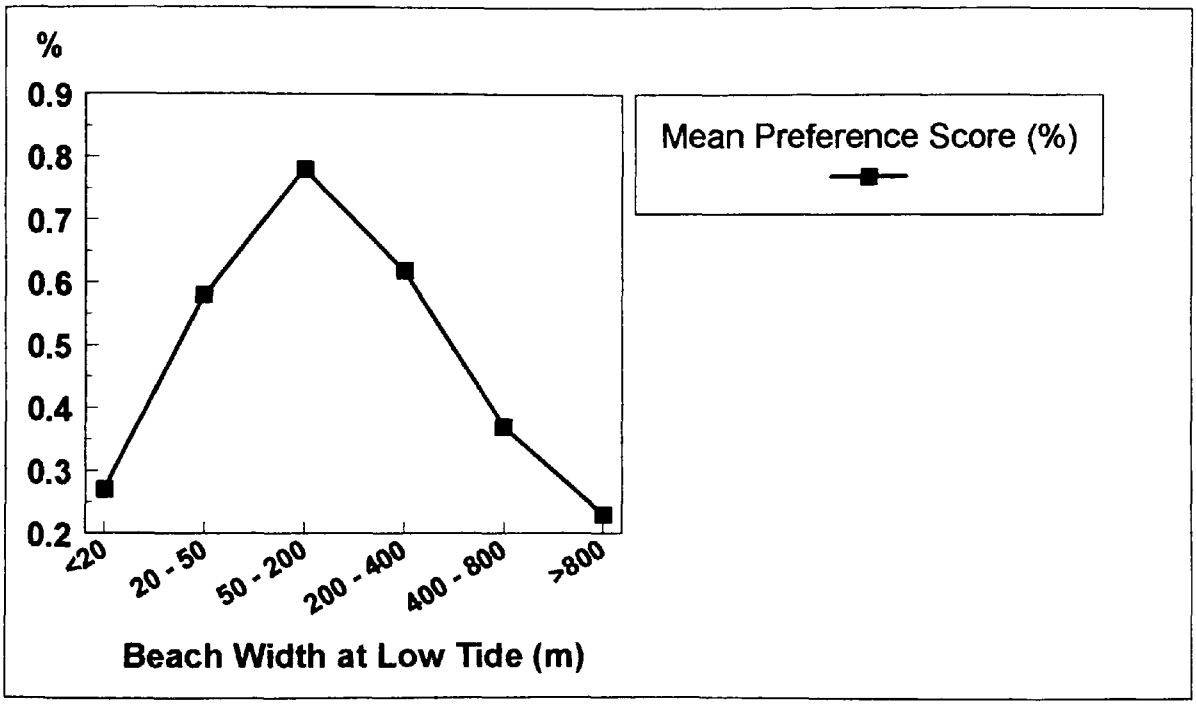


Fig. 6.10 Preference Scores for High Tide Beach Width

Beach Material

Unsurprisingly, the highest preference (2.42%; Fig. 6.11) was for sand. This was the first preference choice for 97.1% of those interviewed.

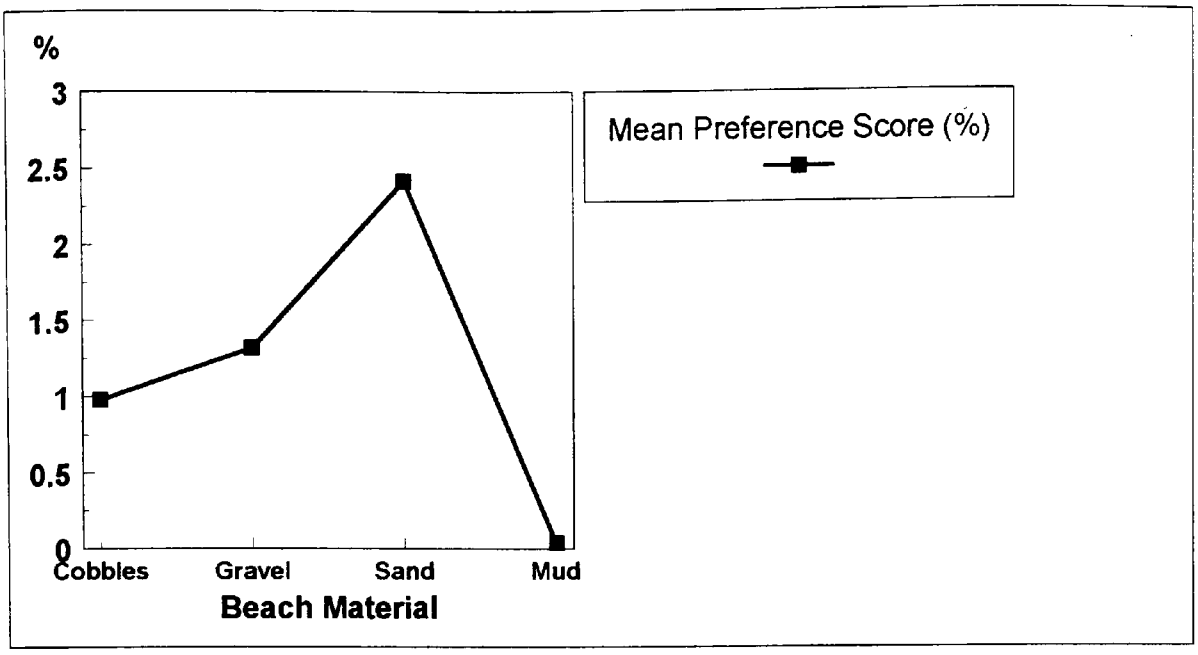


Fig. 6.11 Preference Scores for Various Beach Materials

Preference score for sand showed a relationship to preferred beach type (Fig. 6.12, Table 6.1).

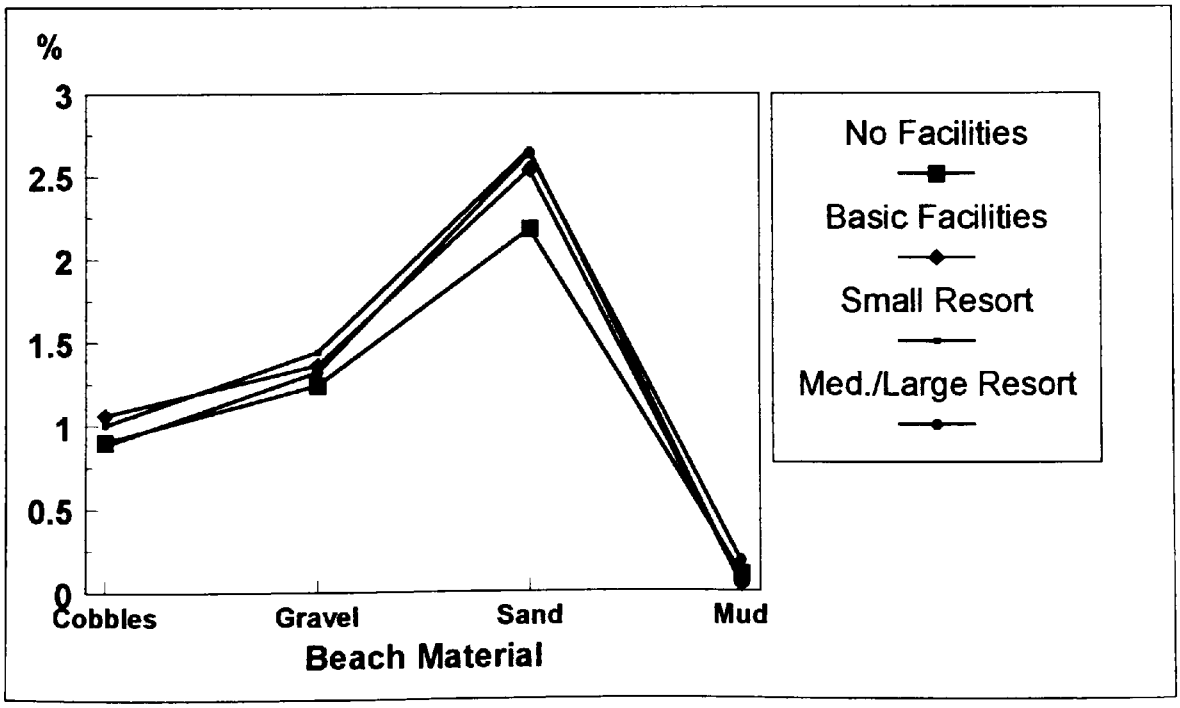


Fig. 6.12 Preference Scores for Beach Material, for those Preferring Each Beach Type

Preferred Beach Type	Preference Score for Sand as Beach Material
No facilities	2.18
Basic facilities	2.54
Beach at a small resort	2.66
Beach at a medium/large resort	2.64

Table 6.1 Preference Score for Sand for Users Preferring Each Beach Type

The most marked difference in Table 6.1 is seen between those preferring beaches with no facilities compared to the other categories. It may be that these people have less interest in the traditionally promoted "sand beach" type of beach visit and have more interest in relaxation, peace and enjoyment of scenery.

Water Temperature

Highest preference for bathing water temperature was 70 - 80°F (22 - 26°C; Fig. 6.13).

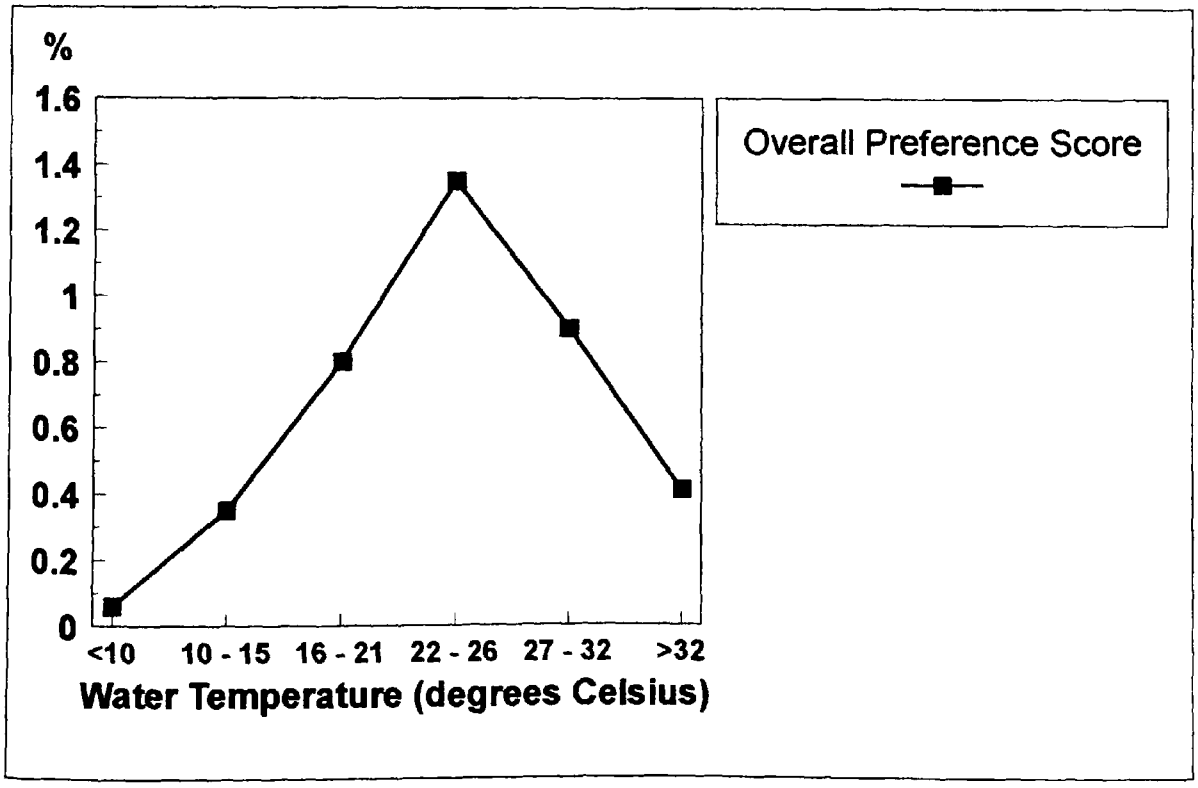


Fig. 6.13 Overall Preference Scores for Bathing Water Temperature

This most preferred water temperature was well outside the range likely to be encountered on the Welsh coastline, where peak water temperatures rarely exceed 18°C. Much lower temperatures are usual early in the EC bathing season, bringing the mean temperature for the period May - September into the range 10 - 15°C. The score for this temperature range (10 - 15°C) was less than one third of that for the preferred 22 - 26°C range (Fig. 6.13). Although this was the highest preference across all beach types, those beach users preferring more developed resorts tended to give higher scores to even higher water temperatures (Fig. 6.14).

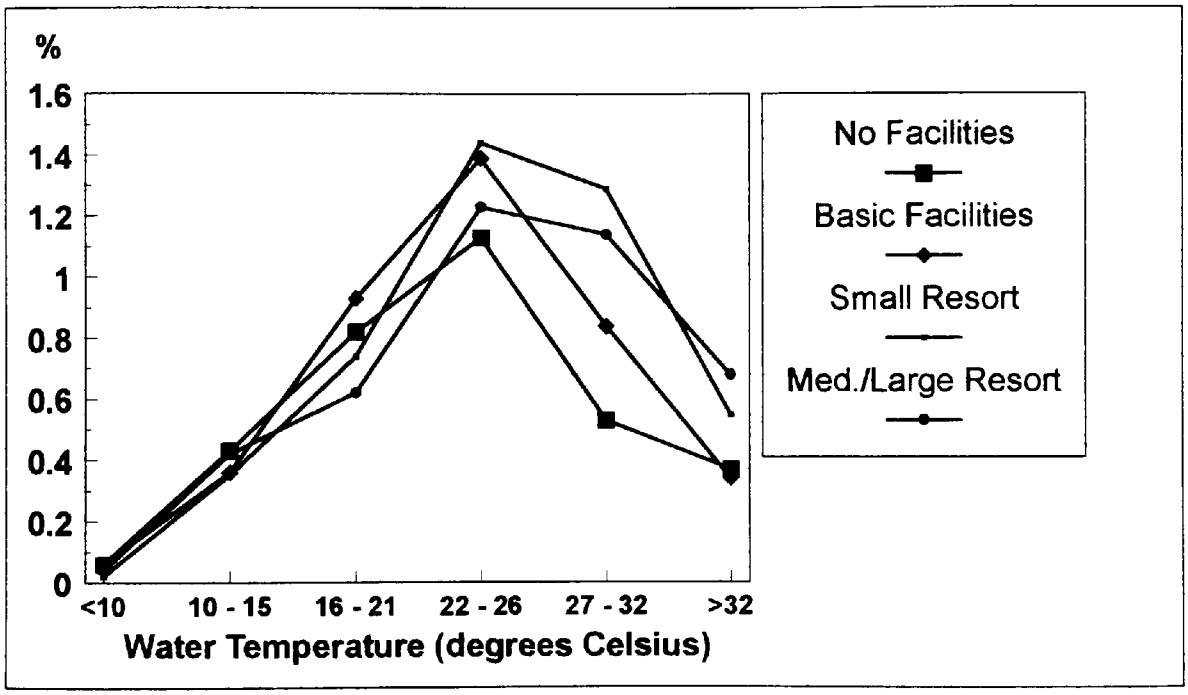


Fig. 6.14 Preference Scores for Water Temperature According to Preferred Beach Type

A drawback of the questionnaire survey was its restriction to beach users on the "dry" part of the beach, i.e. people in the water either paddling or swimming were not interviewed. It would be interesting to discover how preference for bathing water temperature relates to actual water use at Welsh beaches and whether there are differences in preferred temperature according to water use. Low bathing water temperature may be seen as a discouragement to Welsh (and UK) beach use. While this factor is of course outside management control, further

investigation of such aspects could be of value in guiding the content of publicity material and assisting decision making regarding provision of other beach attractions.

Beach Microclimate (Shelter)

Highest preference (1.44%) was for a beach that was "sheltered but with some breeze", for users preferring all beach types (Fig. 6.15), followed by "sheltered from all breezes". "Very exposed" was given the lowest preference score (mean 0.12%). There were no notable differences according to preferred beach type.

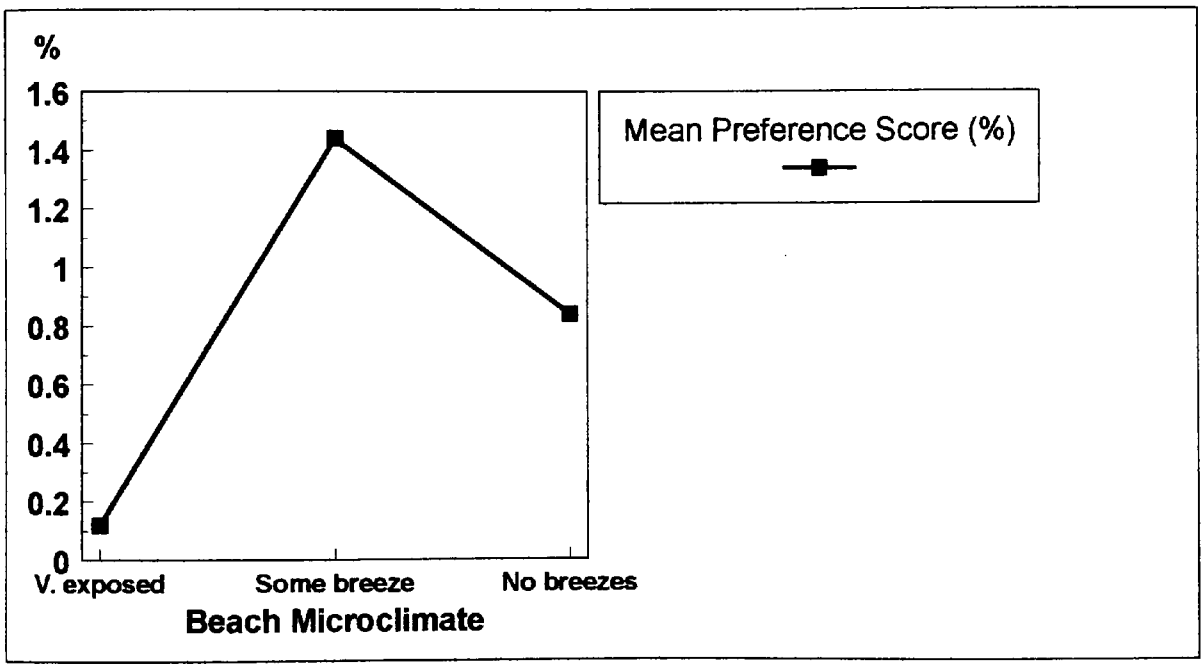


Fig. 6.15 Preference Scores for Beach Shelter/Microclimate

Breaking Wave Size

Highest preference overall was for a wave height of 1 to 3 feet (30 cm - 1m). However, those beach users preferring more commercialised beaches tended to prefer smaller breaking waves; the highest preference scores for those preferring to visit small and medium/large resorts, were for breaking wave sizes of 4 inches to 1 foot (10 - 30 cm; Fig. 6.16).

The results suggested those preferring undeveloped beaches might like the spectacle of large, dramatic waves on the sea to complement the natural, wild beach environment. In contrast, those preferring resort beaches might wish for a calmer sea, not only suggesting a desire for safe bathing conditions, but also as an indicator of an environment more under the control and influence of man.

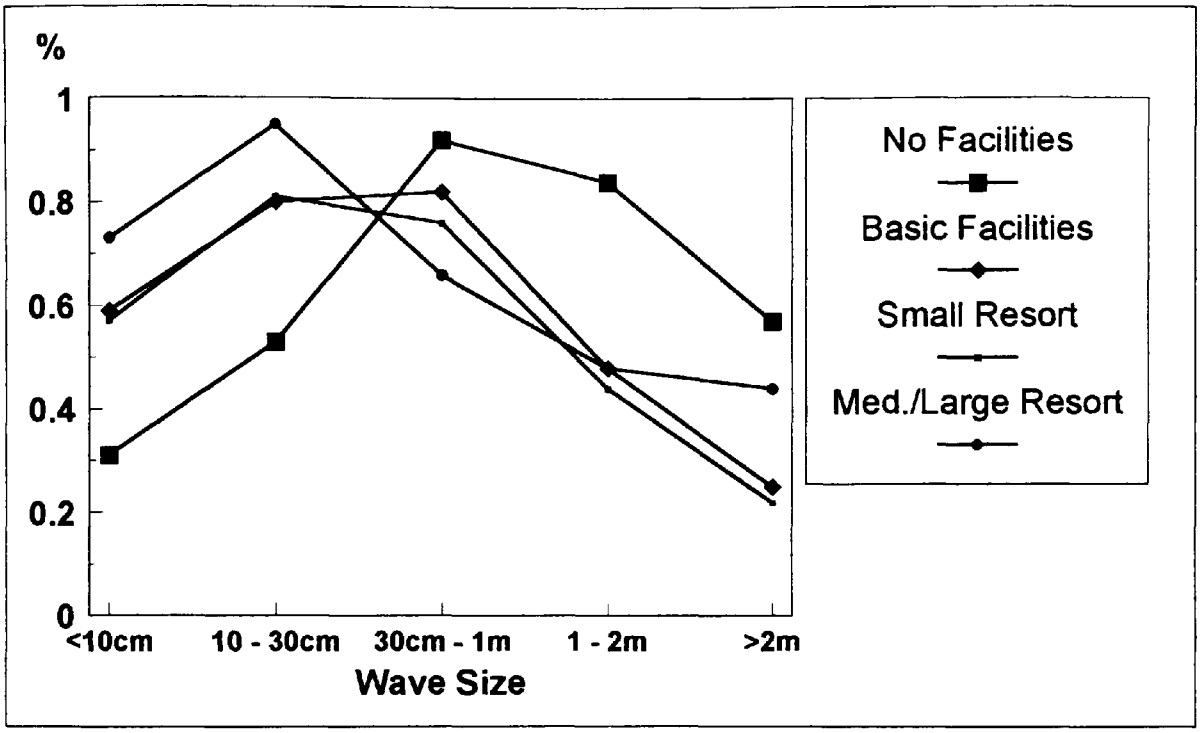


Fig. 6.16 Preference for Wave Size According to Preferred Beach Type

Beach Slope (Above High Water Mark)

Highest preference overall was for a "gently sloping" beach (taken as 5 - 20°), and this was common across all beach type preferences. However, those preferring more commercialised beaches gave higher preference scores to "flat" beaches (Fig. 6.17). Large resort beaches in Wales are more often of this type, in contrast to the pebble "storm beaches" seen at high tide level along much of the Welsh coast.

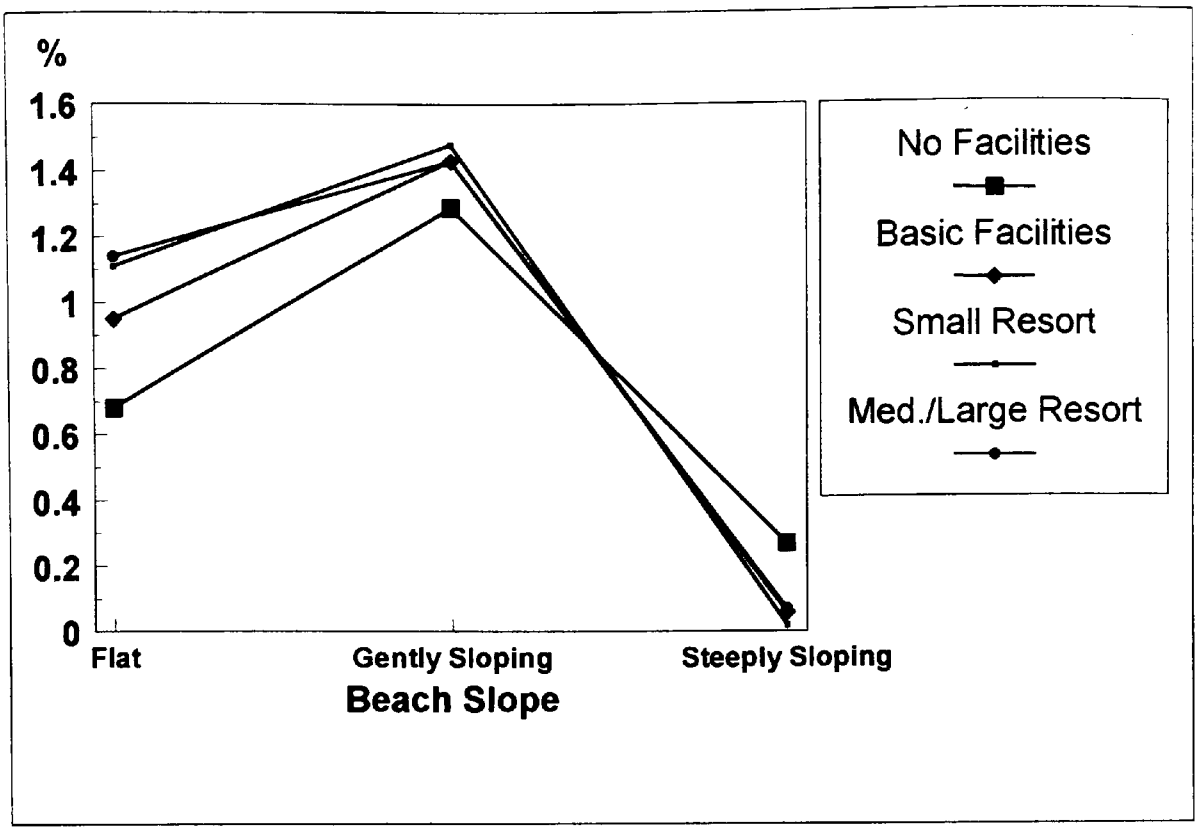


Fig. 6.17 Preference Score for Beach Slope According to Preferred Beach Type

Beach Slope (Distance from Water Edge to 50 cm Depth)

In order to make this aspect accessible and relatable to the lay person, in the questionnaire it was couched in terms of how high the water would be upon walking 10 yards into the sea ("If I walk 10 yards into the sea I'd like the water to be: up to my neck/up to my waist/up to my knees/at my ankles"; Appendix 10). These were related by geometric calculation to distances from the water edge to 50 cm water depth at mid-tide, with the questionnaire descriptions equated to the mid-point of the checklist categories (3m or less, 3 - 7m, 7 - 20m and >20m respectively). Highest overall preference was for 50 cm water depth to be reached within 3 - 7m, i.e. water up to an adult's waist after walking 10 yards into the sea (Fig. 6.18). However such a depth reached within 10m of the water's edge could be dangerous for a child. There were no notable differences in preferences between those preferring different beach types.

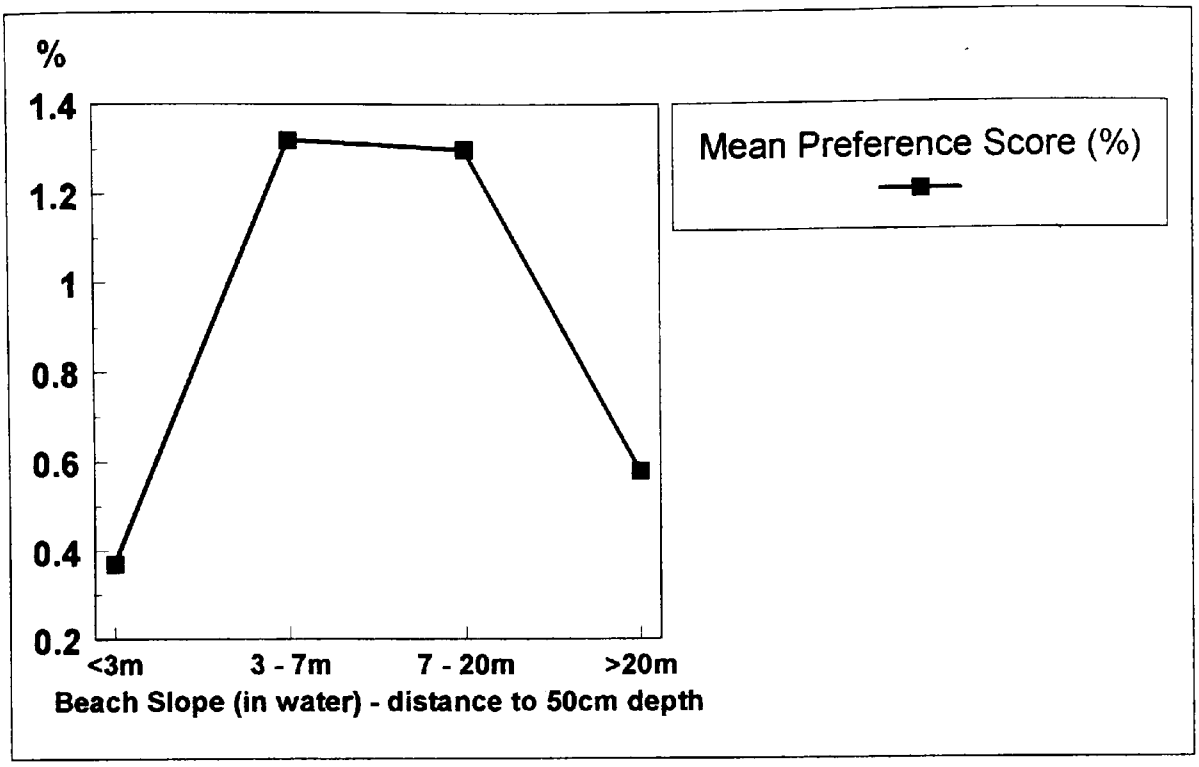


Fig. 6.18 Preference Scores for Underwater Beach Slope

Sand Colour

Highest overall preference score was given to "light tan" coloured sand, although those preferring beaches with no facilities gave a slightly higher score (1.54% compared to 1.52%), to "white" sand (Fig. 6.19). "Grey" and "black" sand colours received low scores (0.02% and 0.10% overall, respectively). It may be that beach users preferring undeveloped beaches have a greater desire for the pristine natural environment suggested by white sand.

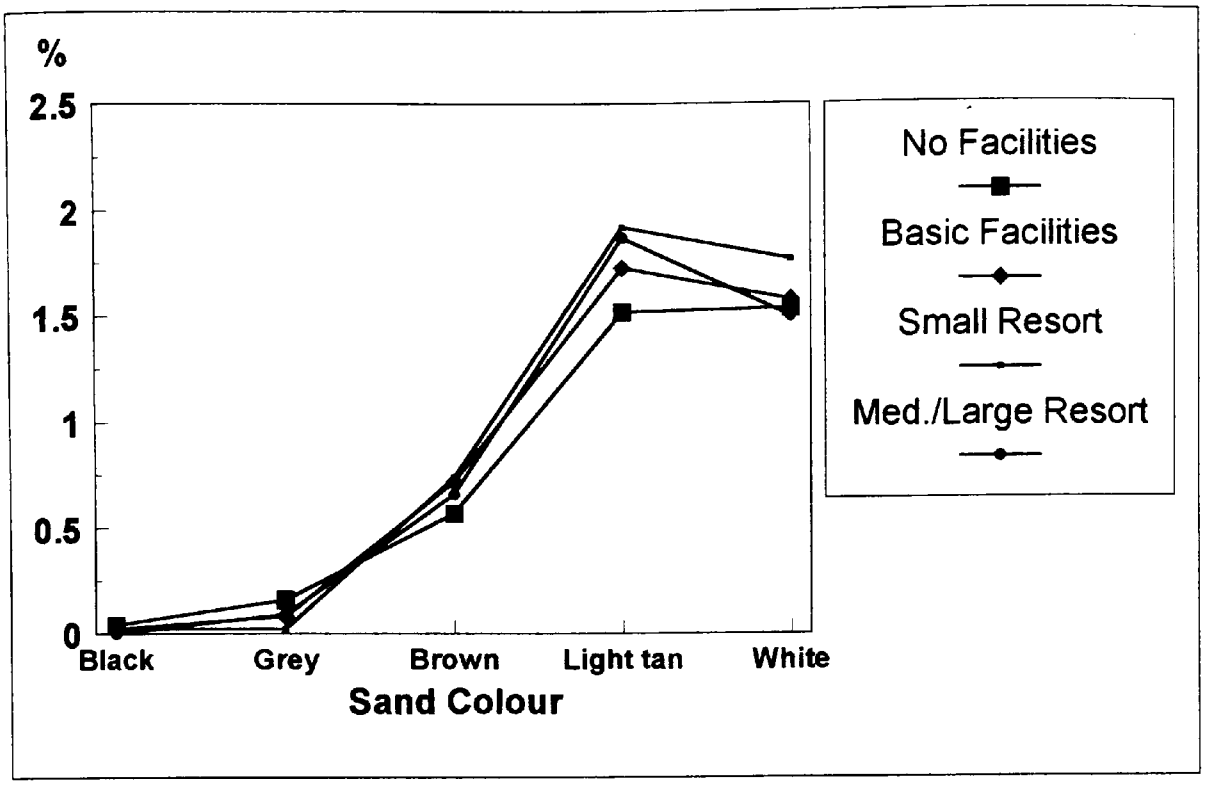


Fig. 6.19 Preference Scores for Sand Colour According to Preferred Beach Type

Temperature Sensation

Taking a mean of all beach users interviewed, the temperature sensation "warm" received the highest preference score. However, there was a tendency for those preferring more commercialised beach types to prefer a warmer temperature sensation. For those preferring beaches at medium/large resorts, the highest score was given to the temperature sensation "hot" (Fig. 6.20).

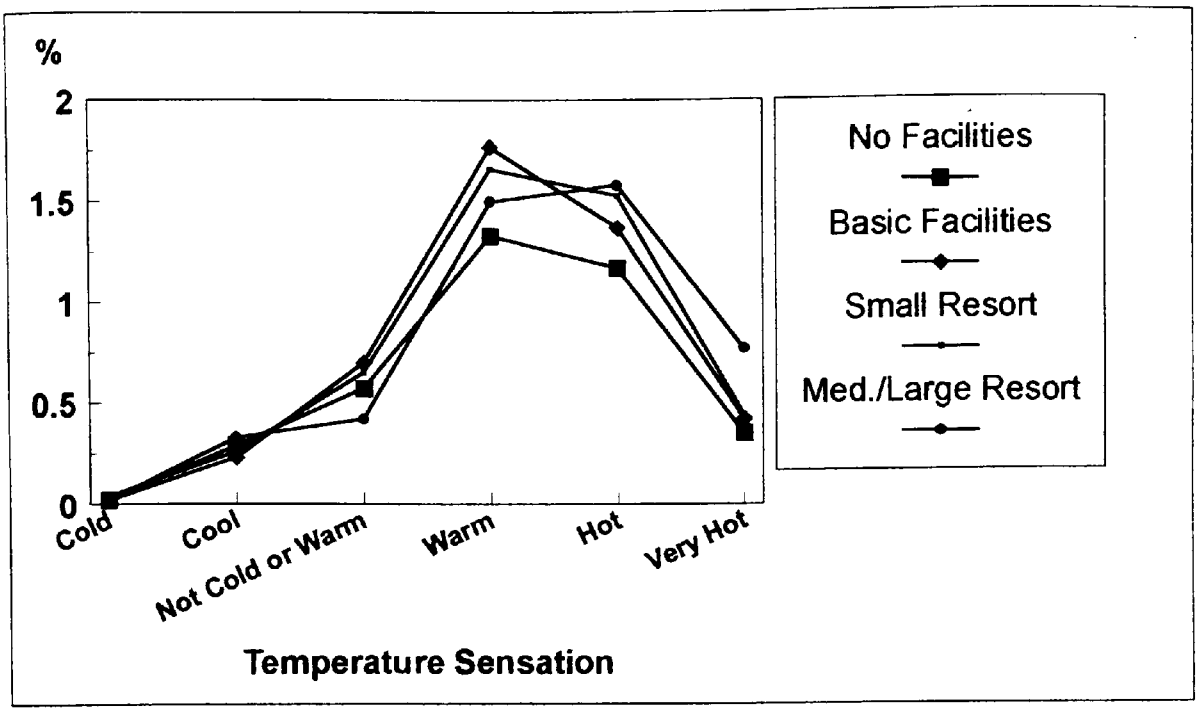


Fig. 6.20 Preference Scores for Temperature Sensation According to Preferred Beach Type

Road Access to the Beach/Resort

Preferences for road access to the beach/resort showed marked differences according to preferred beach type (Fig. 6.21).

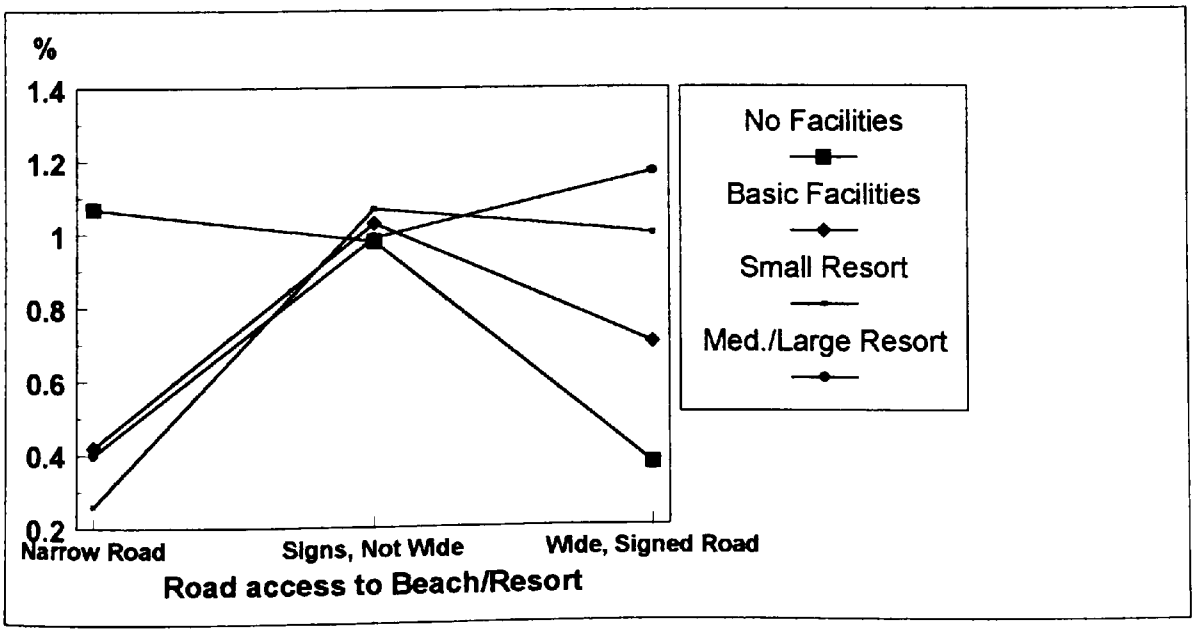


Fig. 6.21 Preference Scores for Road Access for each Preferred Beach Type

For users preferring beaches with no facilities, highest preference score was given to access by "a narrow road" with gradation to highest preference for access via a "wide, signposted road" for users preferring beaches at medium/large resorts. Such aspects should be kept in mind by planners when considering beach access improvements. It may be that those preferring undeveloped beaches would not wish to encourage increased beach visitor numbers to such beaches by improvement of access. Such improvement might encourage commercial development and destroy the very environment which they consider attractive.

As noted earlier, many beach users stating a preference for undeveloped beaches were actually at other types of beaches at the time of the survey. It is possible that such people had a mental picture of what an undeveloped beach should be like in terms of access, approach and perhaps many other factors, in which access via a wide, signposted road would be incongruous.

Location of Car Parking

User preferences for car park location also differed according to preferred beach type. In this case however, there was one "anomalous" category; those preferring beaches with no facilities. For these users, car parking "over 200 yards away but within ½ mile" (approximately 200m - 1 km), was given highest preference and car parking "within 200 yards of the beach" received the lowest preference score (Fig. 6.22). For all other user groupings with regard to beach type preference, highest preference was given to car parking within 200m of the beach with little variation according to increasing commercialisation level. Again this is a factor which should be borne in mind by beach managers/planners, especially with regard to undeveloped beaches.

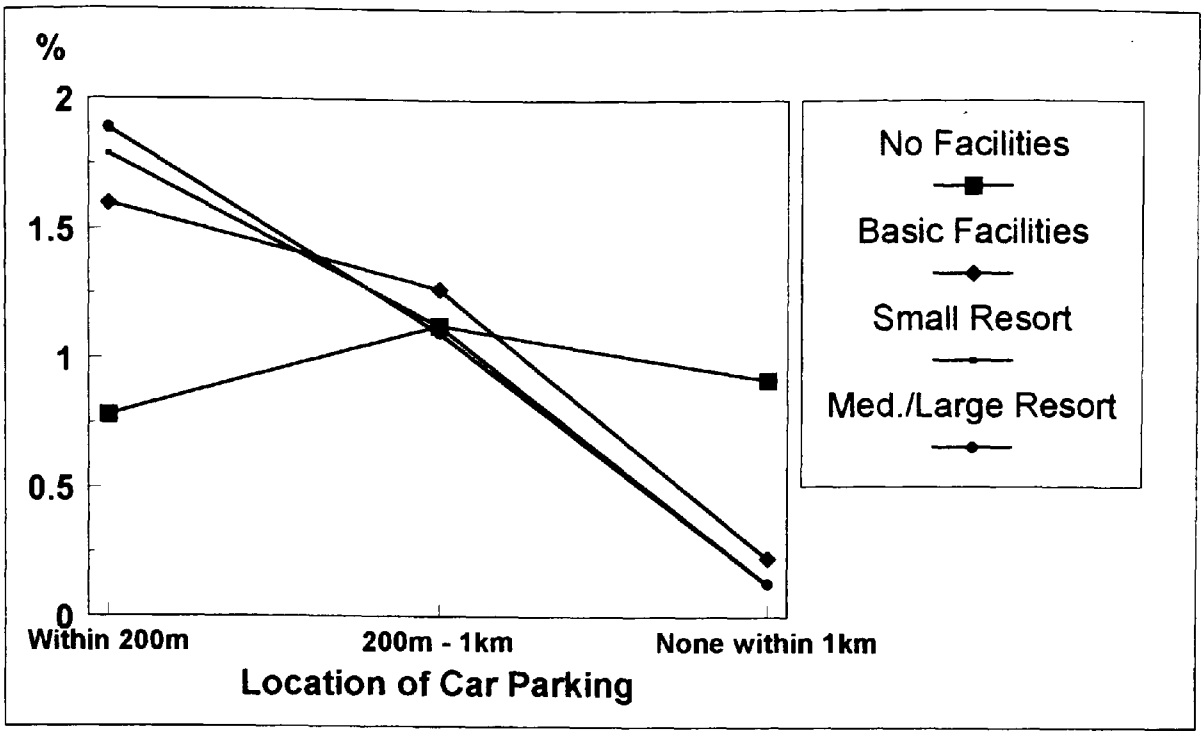


Fig. 6.22 Preference Scores for Car Parking Location for each Preferred Beach Type

Access from Resort/Car Park

For this factor, there was a gradation of highest preference score, from access to the beach by "a rough path" for those preferring beaches with no facilities, to "a level path" for those preferring beaches at medium/large resorts (Fig. 6.23). There were corresponding increases in preference for "improved"/engineered beach access (level path/road/tarmac) in parallel with preference for more commercialised beaches. From the appearance of Fig. 6.23, those preferring beach with no facilities constituted an "anomalous category" in terms of the pattern of preferences.

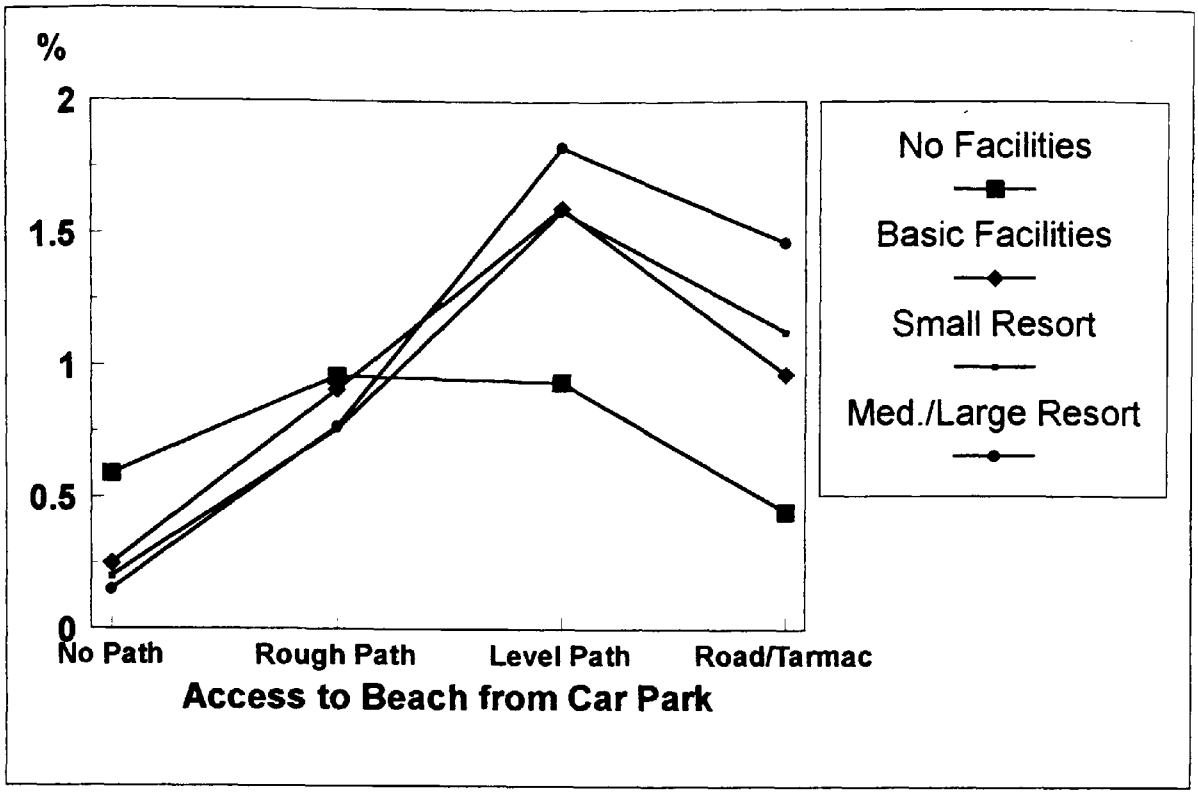


Fig. 6.23 Preference Scores for Beach Access for each Preferred Beach Type

Refreshments/Cafes

As might be expected, preference for more comprehensive refreshment facilities increased with preference for visiting more commercialised beaches. Highest preference changed from "basic refreshments" for those preferring beaches with no facilities, to "cafes with a wide selection of food" for those preferring to visit small and medium/large resorts (Fig. 6.24). Although the beach type category "Beach With No Facilities" implied and also actually specified that no refreshment facilities would be available at such a beach, the data indicated that a large proportion of visitors preferring such beaches would actually like some refreshment provision.

Provision of refreshments is one of the most important commercial aspects for the coastal tourist industry. A much more detailed investigation of beach users preferences for such provision in terms of number of outlets, type/style of premises, choice, etc., for visitors preferring each beach type is an important

requirement for greater understanding of this factor and as a contribution to the beach management/planning process.

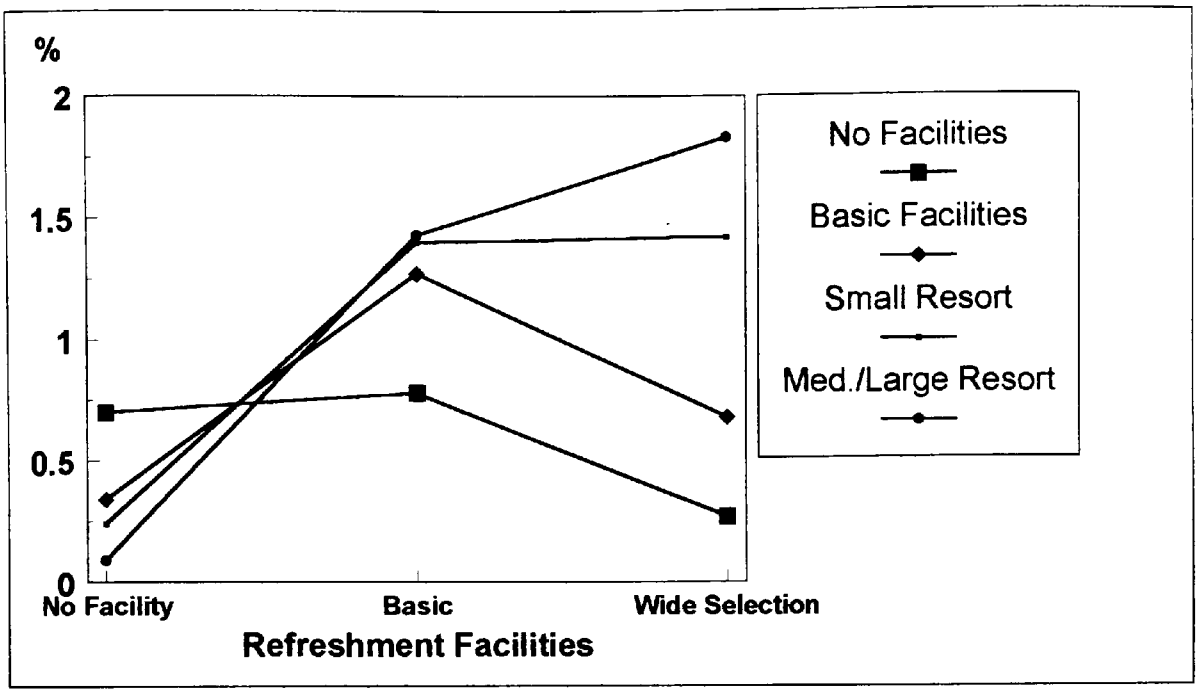


Fig. 6.24 Preference Scores for Refreshment Facilities for each Preferred Beach Type

Availability of Alcoholic Drinks

Overall, 39% of beach users wanted "a bar or cafe serving alcohol at the beach". However, the percentage varied from 27% for those preferring beaches with no facilities or basic facilities, to 67% for those preferring to visit medium/large resorts (Table 6.2).

Preferred Beach Type	Percentage wanting "a bar or cafe serving alcohol at the beach"
No facilities	27
Basic facilities	27
Beach at a small resort	47
Beach at a medium/large resort	67

Table 6.2 Percentage of Beach Users Wanting Alcohol Available for each Preferred Beach Type

Vehicles on the Beach

Overall, only 11.3% of beach users wanted vehicles allowed onto the beach. The only notable variation with preference for commercialisation level, was with regard to the percentage of total beach rating score accounted for by the banning of vehicles from the beach. For those preferring beaches with no facilities, this accounted for 2.64% of total rating score, while for other commercialisation levels this varied from 2.24% to 2.35%.

Dogs on the Beach

Seventy four point six percent of beach users overall, wanted dogs banned from the beach. This percentage increased from 64% for those preferring beaches with no facilities, to 79% for those preferring small resort beaches (Table 6.3). Preference scores for dogs being allowed on/banned from the beach varied accordingly.

Preferred Beach Type	Percentage wanting dogs banned	Preference scores for:	
		dogs allowed	dogs banned
No facilities	64	0.88	1.66
Basic facilities	75	0.57	1.58
Beach at a small resort	79	0.44	1.46
Beach at a medium/large resort	74	0.42	1.58

Table 6.3 Percentage Wanting Dogs Banned, with Preference Scores

Regulation of Water Sports

For all preferred beach types, highest preference was for water sports to be allowed in one area only. However, the preference score for banning of water sports was highest for those preferring beaches with no facilities (1.05%; Fig. 6.25), c.f. 0.37% for those preferring beaches at medium/large resorts. Again the "peace and quiet" aspect of such beaches could account for this preference at undeveloped beaches, although no distinction was made in the questionnaire

between motorised water sports (water-skiing, jet-skiing) and the almost silent non-motorised sports such as surfing, sail-boarding, etc. Further investigation of this aspect taking account of this possible distinction in user preferences is called for. The restriction of the questionnaire survey to users of the "dry" part of the beach environment effectively excluded most water sport participants from the study. Obviously, the desires of these users of the beach environment need to be investigated and taken into account by beach management when contemplating water sport restrictions.

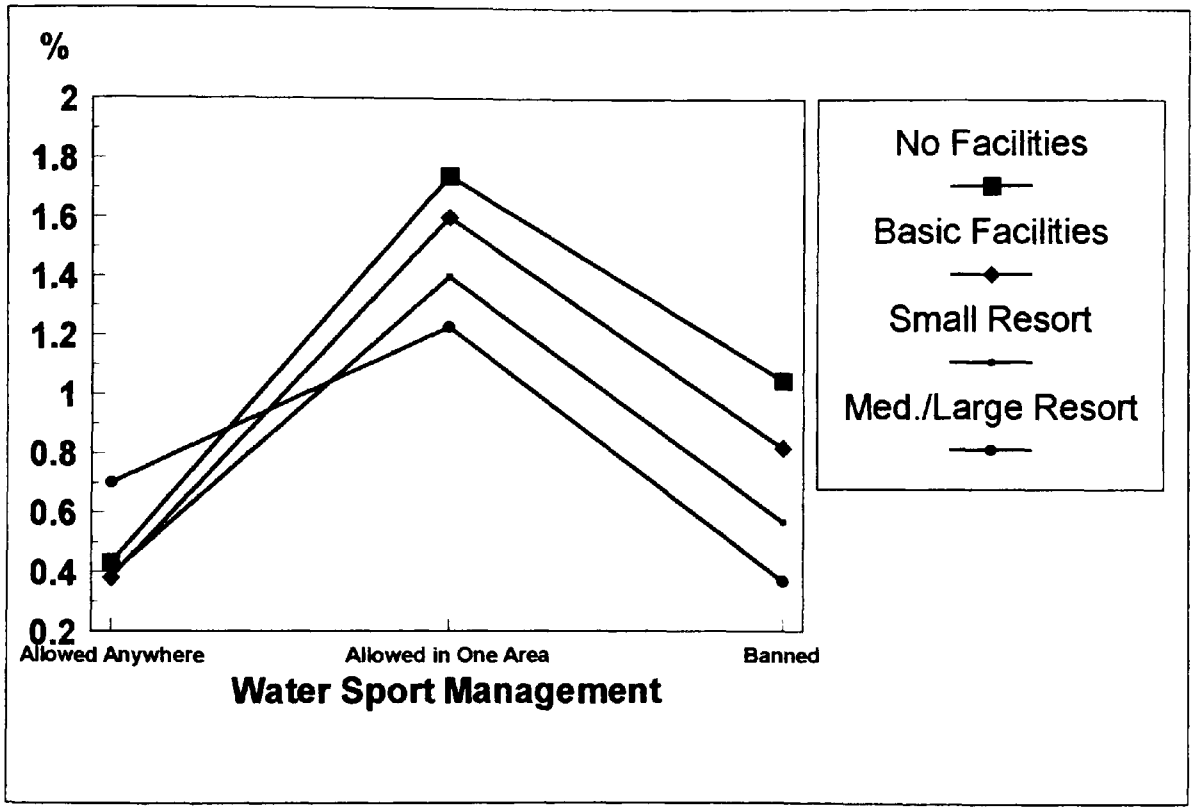


Fig. 6.25 Preference Scores for Water Sport Management for Each Preferred Beach Type

6.2.2 Priorities

Overall mean beach user priority levels (in percentages) are shown in order of decreasing priority in Table 6.4. Those beach aspects for which preferred status was selected by beach users rather than assumed, are shown in *italics*.

Beach Factor	Priority (%)	Beach Factor	Priority (%)
Landscape Quality	11.30	*Water Temperature*	*2.12*
Beach Safety	8.28	*Car Park Location*	*2.12*
Water Quality	3.12	Lifeguard Provision	2.12
Sewage Debris	3.04	Submerged Obstacles	2.10
Litter	3.04	Wind	2.10
Odours from Industry	3.00	*Alcohol Availability*	*2.01*
Oil on Beach	2.97	*Underwater Beach Slope*	*1.95*
Cleanliness of Toilets	2.97	*Access onto Beach by Path*	*1.93*
Industrial Noise	2.76	Rock Pool Fauna	1.93
Dangerous Cliffs	2.70	*Water Sport Control*	*1.90*
Traffic Fumes	2.70	Washing/Drinking Water	1.81
Toilet Provision	2.61	*Wave Size*	*1.80*
Vehicles on Beach	*2.61*	*Refreshment Provision*	*1.73*
Beach Material	*2.57*	*Beach Slope*	*1.73*
Water Clarity	2.48	*High Tide Beach Width*	*1.73*
Floating Material	2.38	Odours from Catering	1.73
Rainfall	2.35	Flora	1.71
Temperature Sensation	*2.33*	*Shelter/Microclimate*	*1.71*
Dangerous Animals in Water	2.31	*Road Access*	*1.58*
Sand Colour	*2.20*	*Low Tide Beach Width*	*1.58*
Vehicle Noise	2.20	Fishy/Seaweed Smells	1.48
Sunshine	2.16	Seaweed on Beach	1.39
Insect Pests	2.14	Showers	1.03
Dog Control	*2.14*	Chairs/Sunbed Availability	0.96

Table 6.4 Overall Beach User Priority Levels

By far the highest priority value calculated by the methodology used, was given to scenery/landscape quality (11.30%). As described in Chapter 5.3.3, the priority score for this factor was calculated using a separate scale to that used for the other factors. The second highest prioritised item, beach safety (8.28%), was calculated from the sum of 4 questionnaire priority questions (Chapter 5.6). Priorities for the remaining factors were each calculated from a single priority question in Part 3 of the questionnaire. These ranged in priority score from 3.12% down to 0.96%, a ratio of 3.25. This factor (3.25), is in effect the level of discrimination as measured by the questionnaire, between individual beach factors of greatest and least importance to users. What "true" level of discrimination (in terms of a ratio) in beach factor prioritisation exists in people's perception of beaches is a problematic point. It could well be that a slightly different questionnaire design in terms of priority scaling in this section of the questionnaire, would produce a significantly different level of discrimination. Such possibilities have been discussed by Driscoll *et al.*, (1994).

It is interesting to note that the ratio between the highest priority score derived from a single questionnaire priority question (water quality, 3.12%), and the priority score for scenery/landscape quality (11.30%), was greater (3.62) than the ratio between the highest and lowest priority scores calculated from a single questionnaire priority question. This again suggests that measurement of beach user priority levels could be highly sensitive to the structure of the measuring instrument, i.e. the questionnaire format, scaling system and data processing procedure. This study has barely scratched the surface of the conceptual and practical issues which need to be explored in order to develop a totally convincing and satisfactory beach user priority measuring system. Such a system might aim to accurately reflect beach user prioritisation of various beach factors, in a fashion enabling beaches to be rated in a way truly reflecting their desirability to potential users. However, this work appears to indicate that it is practicable in principle to measure beach users priority levels for a large number of the factors making up the beach environment.

For those factors whose priority was calculated from individual questionnaire questions in Part 3, factors concerned with environmental quality were generally given high priority ratings. These included water quality (3.12%), absence of sewage debris (3.04%), litter (3.04%), industrial odours (3.00%), oil (2.97%), industrial noise (2.76%) and traffic fumes (2.70%). These results support the work of earlier researchers (e.g. Dinius, 1981; Smith *et al.*, 1991; Lant & Mullens, 1991), who contended that only leisure locations enjoying good standards of environmental quality could expect to be perceived by potential users as offering potential for good quality recreation and enjoyment. It was also interesting to note that in the pilot study at the GHC, 23% of beach users mentioned a clean beach and/or sand in relation to the best beach they had visited and 15% mentioned bathing water quality (Chapter 4.6.5). The two parts of the study therefore appear to support each other in terms of the identification of beach users' priorities.

Factors based on facilities were generally allotted a lower priority, e.g. chair/sunbed availability (0.96%), showers (1.03%). Also, preference for the presence of many facilities could not be assumed. In the questionnaire, the preference selection process (Part 2 of the questionnaire), often resulted in significant proportions of beach users stating that specific facilities should not be provided, or limited in extent (as discussed in Chapter 6.2.1). This contrasts to some extent with the requirements for awards such as the Blue Flag and the Seaside Award, where the presence of particular facilities are stipulated. The impression gained is that many beach users do not necessarily desire beaches to be "improved" by managers and planners, either in terms of supplementation of near-beach facilities (e.g. refreshments, car parking), or in terms of resort/area infrastructure development to ease access (wider access roads, constructed paths). Whether such apparent desires to limit development are directly the result of wishing to preserve a more pristine, uncommercialised beach environment, or a fear that such development could lead to increased visitor numbers resulting in crowding, increased noise and indirect reduction in enjoyment at the beach, is not clear. In view of the potential importance to beach managers of such preferences, further research is demanded to elucidate this aspect.

For beach rating purposes, mean beach user priorities (in terms of percentage of total beach rating score) were calculated separately for beach user groups preferring each beach type as described in Chapter 5.3.2. As mentioned in Chapter 6.1 the categories of beach users preferring to visit beaches at medium sized resorts and large resorts were combined. A breakdown of preference levels according to preferred beach type is given in Table 6.5. The beach factors are listed in order of decreasing priority level as given by those beach users preferring a beach with no facilities.

Multiple regression analysis was carried out to examine the statistical validity of trends in priority level with stated preferred beach type. Twenty six individually prioritised beach aspects from Part 3 of the questionnaire, were shown to be linked to beach type preference. Priority given to scenic/landscape quality, priority for beach safety aspects and ranking of "Facilities", "Sand and Water Quality" and "Access and Parking" (Part 4 of the questionnaire), were also shown by multiple regression analysis to be linked to beach type preference. These are discussed later in this Chapter. Multiple regression equations relating mean preference levels for beach factors to dependent beach variables are shown in Tables 6.6 and 6.7.

A commercialised beach environment is in many ways synonymous with the presence of car parking, improved beach access, refreshments and sanitary facilities. In the questionnaire itself, this connection was made explicit by the descriptions included of the five beach categories from which users were asked to select their preferred type. Some of the aspects included in the descriptions (such as cafes, car parking), were among the factors which users were asked to prioritise in Part 3 of the questionnaire. In contrast a beach without specific facilities for visitors generally implies (with few exceptions in the UK context), a beach in a rural location which may be perceived as not suffering from a high level of pollution from human sources or scenic intrusion from built structures. Selection of preferred beach type (discussed in Chapter 6.7), could therefore be regarded as an inevitable consequence of beach users' priorities in the beach environment.

Beach Factor	Priority of Users Preferring Each Beach Type (%)			
	No Facilities	Basic Facilities	Beach at Small Resort	Medium/Large Resort
Landscape Quality	14.80	11.70	8.83	8.87
Beach Safety	7.07	8.36	8.52	7.48
Sewage Debris	3.46	3.06	2.99	2.97
Water Quality	3.42	3.10	2.99	2.99
Litter	3.36	2.98	2.90	3.01
Odours from Industry	3.32	2.98	2.90	2.68
Oil on Beach	3.12	2.93	2.99	2.75
Traffic Fumes	3.11	2.68	2.55	2.33
Industrial Noise	3.10	2.74	2.64	2.51
Vehicles on Beach	*2.93*	*2.38*	*2.59*	*2.88*
Water Clarity	2.73	2.43	2.40	2.51
Cleanliness of Toilets	2.67	3.00	2.86	2.79
Dangerous Cliffs	2.58	2.68	2.79	2.60
Vehicle Noise	2.54	2.13	2.14	1.98
Dog Control	*2.48*	*2.19*	*1.90*	*2.02*
Water Sport Control	*2.28*	1.90	*1.66*	*1.61*
Floating Material	2.28	2.38	2.42	2.09
Beach Material	*2.28*	*2.55*	*2.66*	*2.62*
Rainfall	2.15	2.26	2.51	2.66
Dangerous Animals in Water	2.13	2.36	2.29	2.40
Alcohol Availability	*2.11*	*1.98*	*1.94*	*1.91*
Temperature Sensation	*1.99*	*2.34*	*2.42*	*2.49*
Sand Colour	*1.99*	*2.15*	*2.38*	*2.20*
Insect Pests	1.99	2.11	2.22	2.07
Flora	1.99	1.67	1.57	1.78
Submerged Obstacles	1.95	2.07	2.20	2.09
Rock Pool Fauna	1.95	1.92	2.03	1.50
Car Park Location	*1.95*	*2.09*	*2.09*	*2.20*
Toilet Provision	1.93	2.66	2.86	2.66
Water Temperature	*1.80*	*2.06*	*2.33*	*2.27*
Odours from Catering	1.80	1.65	1.85	1.50
Wind	1.78	2.05	2.27	2.22
Sunshine	1.72	2.13	2.33	2.42
High Tide Beach Width	*1.70*	*1.77*	*1.72*	*1.58*
Wave Size	*1.68*	*1.54*	*1.53*	*1.78*
Road Access	*1.66*	*1.46*	*1.61*	*1.80*
Low Tide Beach Width	*1.62*	*1.52*	*1.55*	*1.69*
Lifeguard Provision	1.62	2.13	2.22	2.40
Underwater Beach Slope	*1.60*	*2.03*	*2.01*	*2.11*
Beach Slope	*1.58*	*1.67*	*1.79*	*1.87*
Access onto Beach by Path	*1.58*	*1.92*	*1.94*	*2.24*
Shelter/Microclimate	*1.37*	*1.73*	*1.79*	*1.89*
Washing/Drinking Water	1.35	1.69	2.05	2.46
Refreshment Provision	*1.23*	*1.52*	*2.07*	*1.83*
Fishy/Seaweed Smells	1.19	1.41	1.64	1.80
Seaweed on Beach	0.94	1.35	1.55	1.78
Showers	0.82	0.93	1.16	1.56
Availability of Chairs/Sunbeds	0.70	0.84	1.16	1.43
Total of Physical Factors	40.34	39.88	38.13	37.34
Total of Biological Factors	19.34	19.39	19.73	19.38
Total of Human Use Factors	40.32	40.73	42.15	43.28
(Total of Climate Factors)	(6.99)	(8.78)	(8.76)	(8.89)

Table 6.5 Priority Levels According to Preferred Beach Type (factors where preference selected in Part 2 of questionnaire, shown in *italics*)

Beach Aspect and Multiple Regression Equation
Priority for absence of traffic fumes = 1.736 - 0.00354 (Age) - 0.136 (Preferred beach type)
Priority for absence of seaweed/fishy smells = 0.548 + 0.0637 (Preferred beach type)
Priority for absence of factory/commercial noise = 1.795 - 0.00545 (Age) - 0.116 (Preferred beach type)
Priority for presence of rock pools = 0.998 + 0.0761 (Sex) - 0.0869 (Preferred beach type)
Priority for absence of traffic fumes = 1.047 + 0.0840 (Preferred beach type)
Priority for availability of chairs/sunbeds = 0.212 + 0.0947 (Preferred beach type)
Priority for absence of sewage debris = 1.892 - 0.00351 (Age) - 0.119 (Preferred beach type)
Priority for long sunshine duration = 0.862 + 0.0708 (Preferred beach type)
Priority for absence of strong winds = 0.868 + 0.00294 (Age)
Priority for absence of litter = 1.624 - 0.0883 (Preferred beach type)
Priority for absence of dangerous currents = 0.767 + 0.00458 (Age)
Priority for absence of dangerous waves = 0.241 + 0.144 (Preferred beach type) + 0.0830 (Sex) + 0.00342 (Age)
Priority for presence of lifeguards = 0.802 + 0.0774 (Preferred beach type)
Priority for absence of dangerous animals = 0.973 + 0.856 (Origin)
Priority for absence of traffic noise = 1.376 - 0.0849 (Origin) - 0.0915 (Preferred beach type)
Priority for absence of insect pests = 0.872 + 0.00313 (Age)
Priority for presence of drinking water = 0.465 + 0.147 (Preferred beach type)
Priority for dry weather = 0.985 + 0.0557 (Preferred beach type)
Priority for absence of oil pollution = 1.866 - 0.00699 (Age) - 0.0852 (Preferred beach type)
Priority for absence of seaweed = 0.430 + 0.0989 (Preferred beach type)
Priority for absence of smells from industry/commerce = 1.810 - 0.00456 (Age) - 0.104 (Preferred beach type)
Priority for presence of interesting flora around beach = 0.911 - 0.0617 (Preferred beach type)

Table 6.6 Multiple Regression Equations (all visitors, social class excluded)

Priority for clear bathing water	
All, social class excl.	1.397 - 0.0675 (Origin) - 0.0546 (Preferred beach type)
Employed, social class excl.	1.168 + 0.0930 (Sex) - 0.0631 (Preferred beach type)
Employed, inc. social class	1.589 - 0.0575 (Social class) -0.0933 (Origin) - 0.0564 (Preferred beach type)
Priority for absence of water pollution	
All, social class excl.	1.892 - 0.00278 (Age) - 0.133 (Preferred beach type)
Employed, social class excl.	1.697 -0.0891 (Preferred beach type)
Employed, inc. social class	1.854 - 0.0455 (Social Class) - 0.104 (Preferred beach type)
Priority for clean toilets	
All, social class excl.	1.600 - 0.00482 (Planned length of stay) - 0.0835 (Preferred beach type)
Employed, social class excl.	1.524 - 0.0559 (Preferred beach type)
Employed, inc. social class	1.542 - 0.0567 (Social class)
Priority for presence of shower facilities	
All, social class excl.	0.111 -0.00173 (Distance travelled) + 0.0830 (Origin) + 0.113 (Preferred beach type)
Employed, social class excl.	0.176 - 0.0910 (Sex) + 0.106 (Origin) + 0.104 (Preferred beach type)
Employed, inc. social class	-0.0918 + 0.0629 (Social Class) -0.00172 (Distance travelled) + 0.137 (Origin) + 0.0829 (Preferred beach type)

Table 6.7 Multiple Regression Equations (those variables where social class appears in equation)

Scenery/Landscape Quality

The conspicuous apparent link between preferred beach type and priority given to scenic/landscape quality (Fig. 6.26), was confirmed by multiple regression analysis. Priority given to scenery/landscape quality ranged from 14.80 for beach users preferring to visit beaches with no visitor facilities to 8.83 and 8.87 respectively for those wishing to visit small and medium/largeresort beaches.

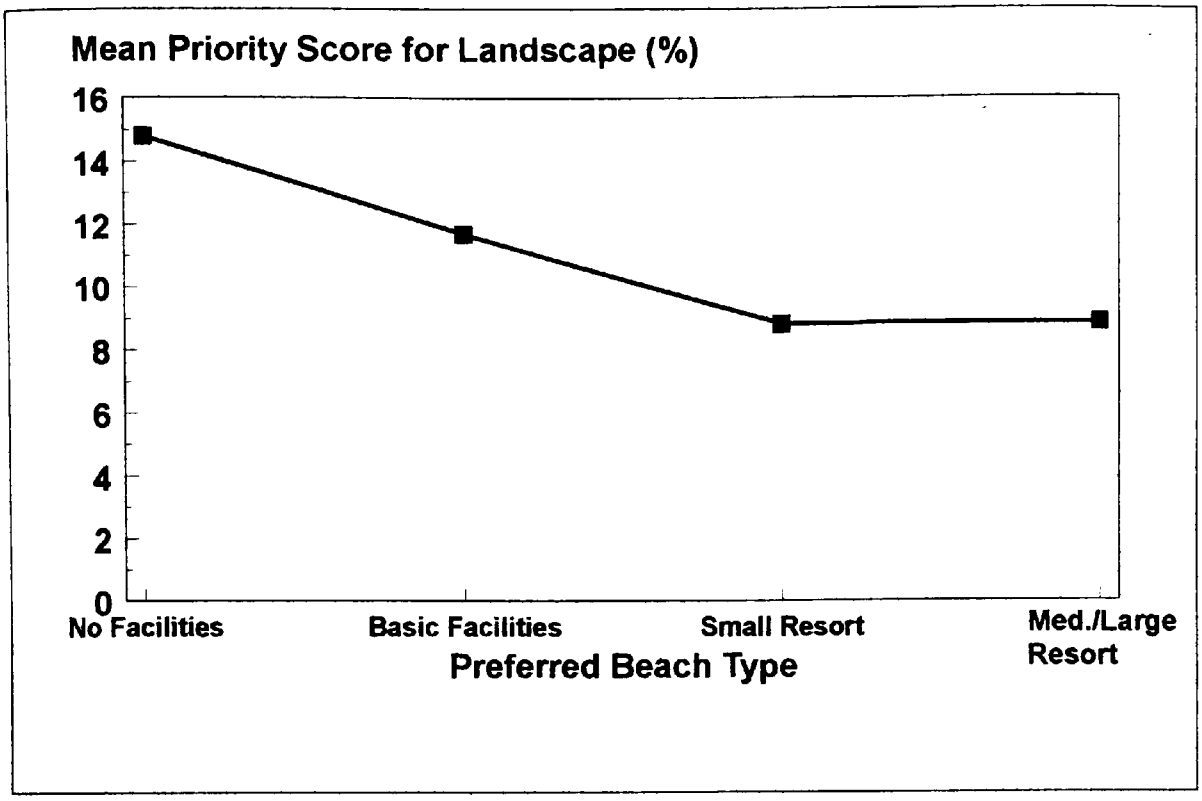


Fig. 6.26 Priority for Landscape Quality According to Preferred Beach Type

In the UK context, a beach with no facilities for visitors generally implies a beach in a rural location without major visual intrusion by built structures. In contrast, preference for a developed commercial beach resort implies a different set of priorities, with emphasis on availability of resort facilities overriding desire for scenic beauty. In the UK, designations such as "Area of Outstanding Natural Beauty" (AONB, e.g. Gower), imply that control should be exercised over visually intrusive development (whether for provision of tourist facilities or for other reasons), in order to preserve high scenic quality. These findings also emphasise the importance of maintaining the pristine scenic quality of undeveloped beach areas, even when a temptation may be present to add commercially-based facilities to undeveloped beaches to enhance the local tourist economy.

These considerations raise the question of whether basic facilities can be installed at relatively undeveloped beaches for the convenience of visitors while inflicting minimal visual intrusion. The possibility that the mere presence of such facilities might cause an increase in visitor numbers with accompanying traffic

problems, parking requirement and path erosion is another concern. Such development could easily become part of a cycle of steadily increasing commercialisation of a beach, with consequent change in character and likely environmental deterioration.

Climatic Factors

Combined priority scores for the 4 climatic factors from Part 3 of the questionnaire (sunshine hours, wind, low rainfall, temperature sensation), were calculated for beach users preferring each beach type. The clear trend evident (Fig. 6.27), was confirmed by multiple regression analysis. Users preferring resort beaches gave higher priority to climatic factors compared to those preferring undeveloped beaches. One might postulate a contrast between those who prefer to visit less commercialised beaches to enjoy the natural attributes of the beach environment and are less concerned about the climate, with those of a more commercial orientation who prefer a traditional "beach resort" with warmth, sunshine and abundant varied facilities to supplement their enjoyment.

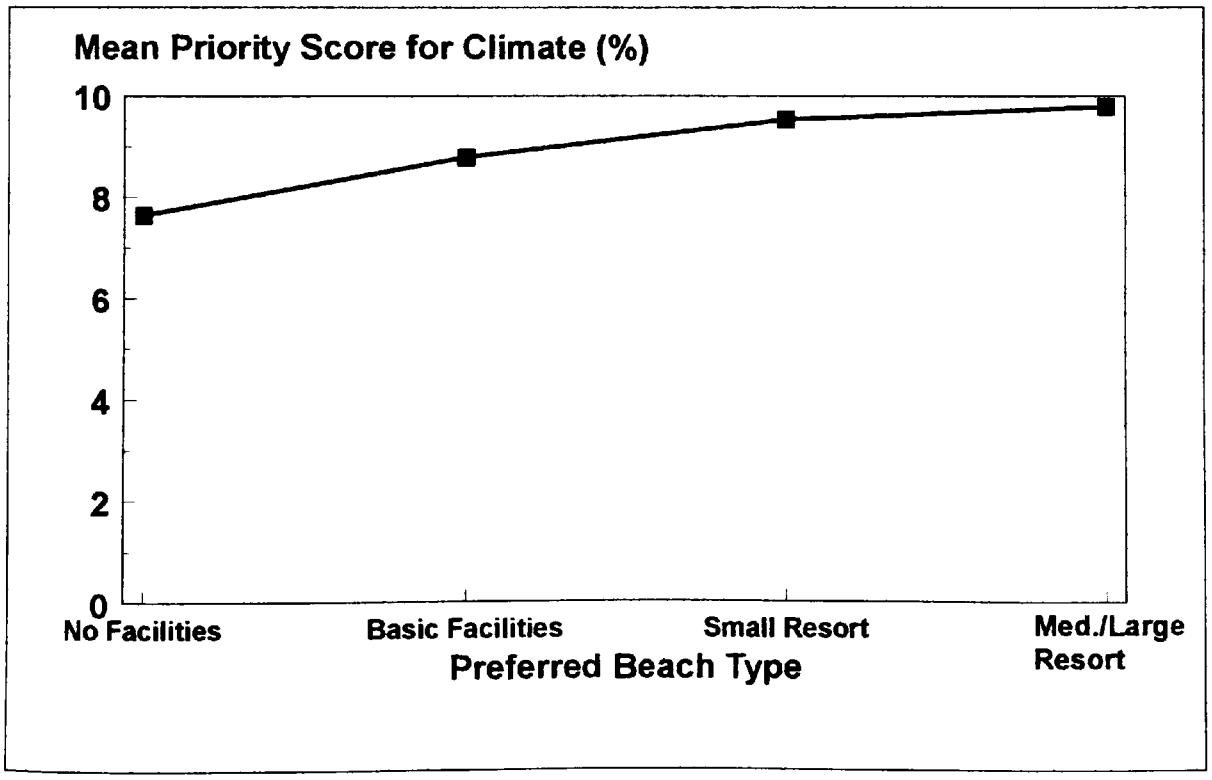


Fig. 6.27 Priority for Climate According to Preferred Beach Type

Bathing Safety

Priority scores for beach safety aspects (those used to calculate beach safety rating; Chapter 5.6), were shown by multiple regression analysis to be linked to preferred beach type, even though the trend was not readily apparent from examination of mean scores (Fig. 6.28). Those preferring an uncommercialised, "natural" environment at the beach, might be less concerned with hazards associated with natural phenomena such as dangerous currents, large waves, etc. Those preferring more commercialised beaches, might be expected to have an image of a beach environment where both the on-shore aspects (facilities, management) and the off-shore (bathing hazards), are controlled for the purposes of human convenience with nature features taking a lower priority.

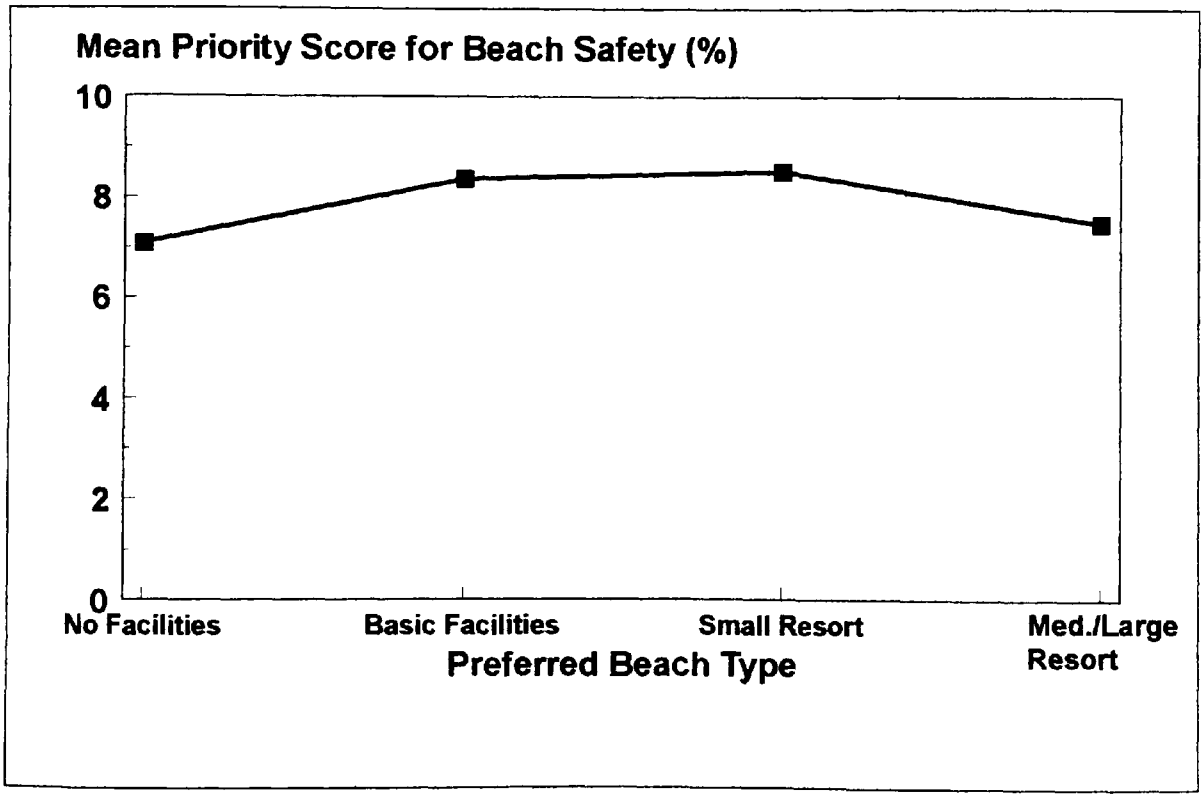


Fig. 6.28 Priority for Bathing Safety According to Preferred Beach Type

Absence of Sewage Debris

Those preferring less commercialised beaches gave higher priority to absence of sewage debris at the beach. The clearest difference in priority given to absence of sewage debris was between those preferring beaches with no facilities (3.46%) and the other groups (2.97 to 3.06%; Fig. 6.29). The extent to which the beach using public actually recognise sewage debris when they see it, the connotations they attach to it and their perception of its possible significance as a water quality indicator are the subject of much current research (Nelson, *pers. comm.*). It has been suggested that the remains of sanitary towels and condoms are the forms of beach debris likely to cause most offence to users (Nelson, *pers. comm.*), although House & Herring (1995), suggested that, unlike sanitary towels, condoms did not seem to have a strongly negative effect on perceived water quality. Possible sources of sewage related debris reaching beaches on the Welsh coastline were discussed in Chapter 4.8.

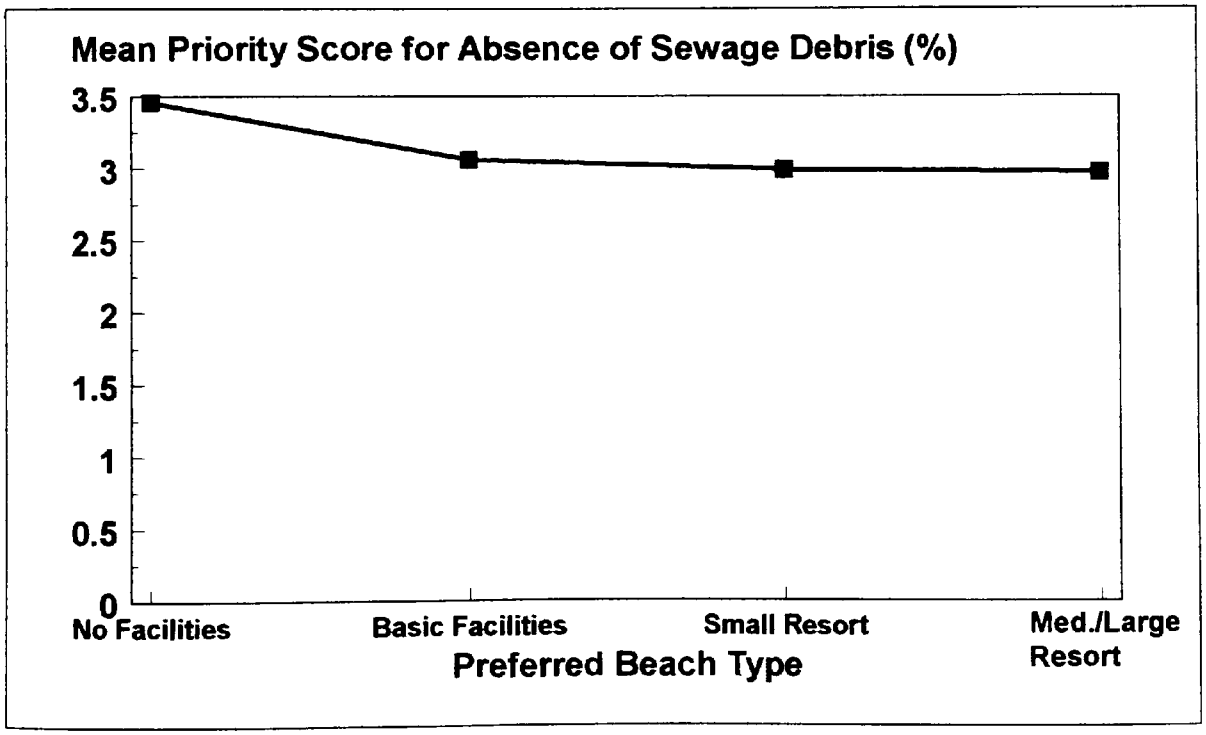


Fig. 6.29 Priority for Absence of Sewage Debris According to Preferred Beach Type

Bathing Water Quality

Priority given to bathing water quality by users preferring different beach types is shown in Fig. 6.30. The suggested trend for greater priority for this factor among those preferring less developed beaches, was confirmed by multiple regression analysis. As with priority for absence of sewage debris, the greatest distinction was between those stating a preference for undeveloped beaches (3.42%) and the other categories (2.99 to 3.10%). This supports the view that those preferring uncommercialised beaches have a greater wish for a pristine, unpolluted environment. However, compared to other beach factors, bathing water quality is still given a high priority by those wishing to visit more commercialised beach resorts, so bathing water quality standards may be seen as an important aspect of the beach visiting experience for a wide range of the beach using public.

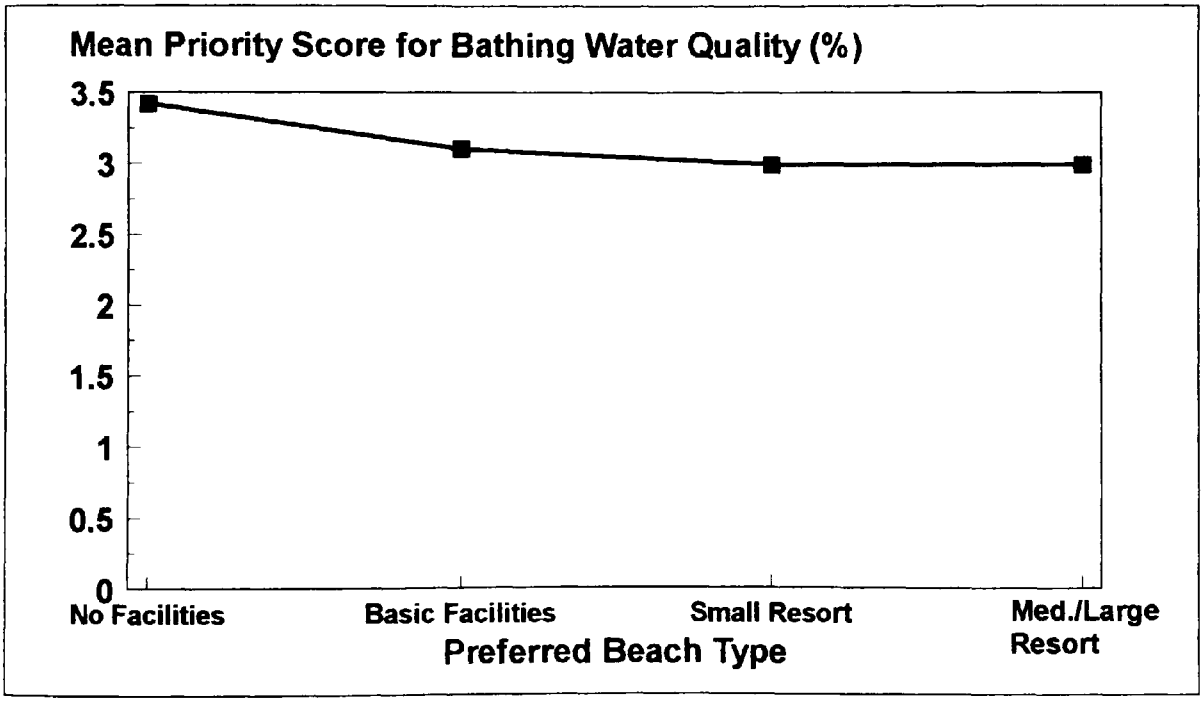


Fig. 6.30 Priority for Bathing Water Quality According to Preferred Beach Type

Absence of Litter

A trend in priority level for litter absence with preferred beach type is not readily apparent from Fig. 6.31. However, multiple regression analysis confirmed a significant correlation, with those preferring less commercialised beaches placing

higher priority on absence of litter. As with sewage debris and discussed in Chapter 4.8, examination of public perception of beach litter contamination is in itself an important field of research (House & Herring, 1995; Williams & Simmons, 1995a). Several workers and organisations (e.g. Dinius, 1981; MCS, 1990), have emphasised the importance of beach contamination by litter in affecting perceived water quality and its detrimental effect on coastal recreation.

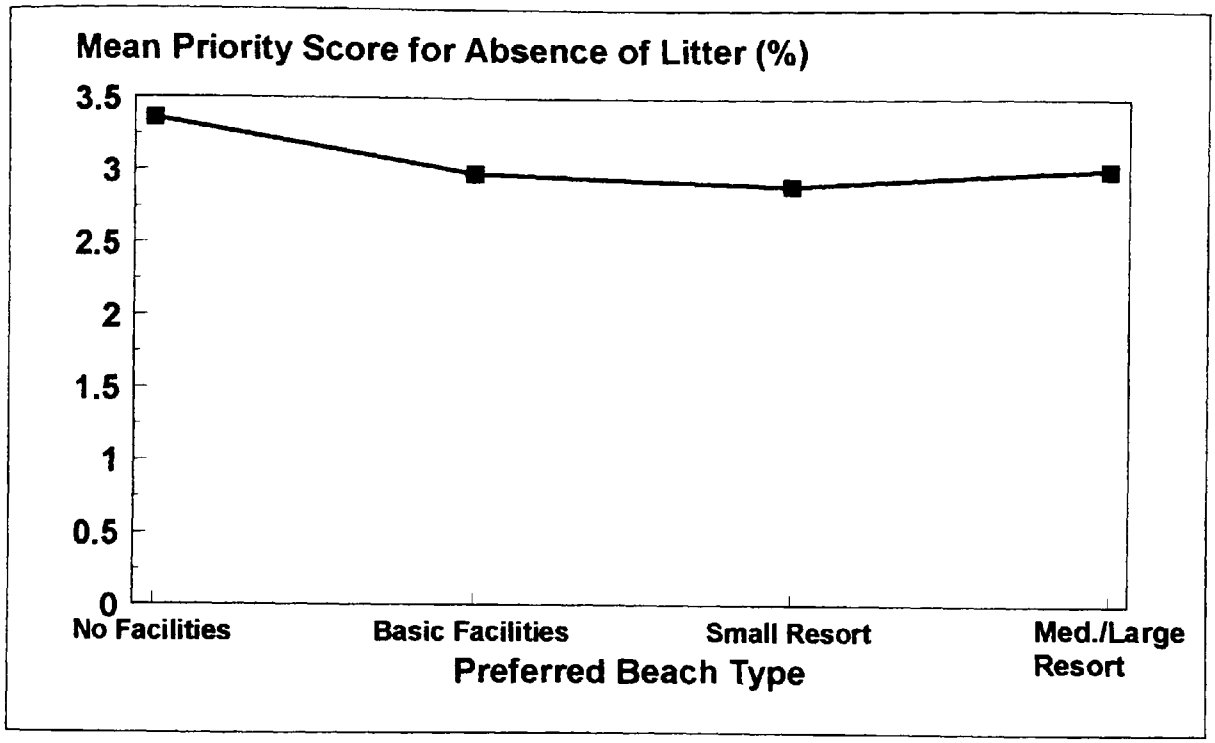


Fig. 6.31 Priority for Absence of Litter According to Preferred Beach Type

Absence of Industrial Smells

Priority for absence of industrial smells/odours showed a relationship to preferred beach type (Fig. 6.32), with higher priority being given by those preferring undeveloped beaches.

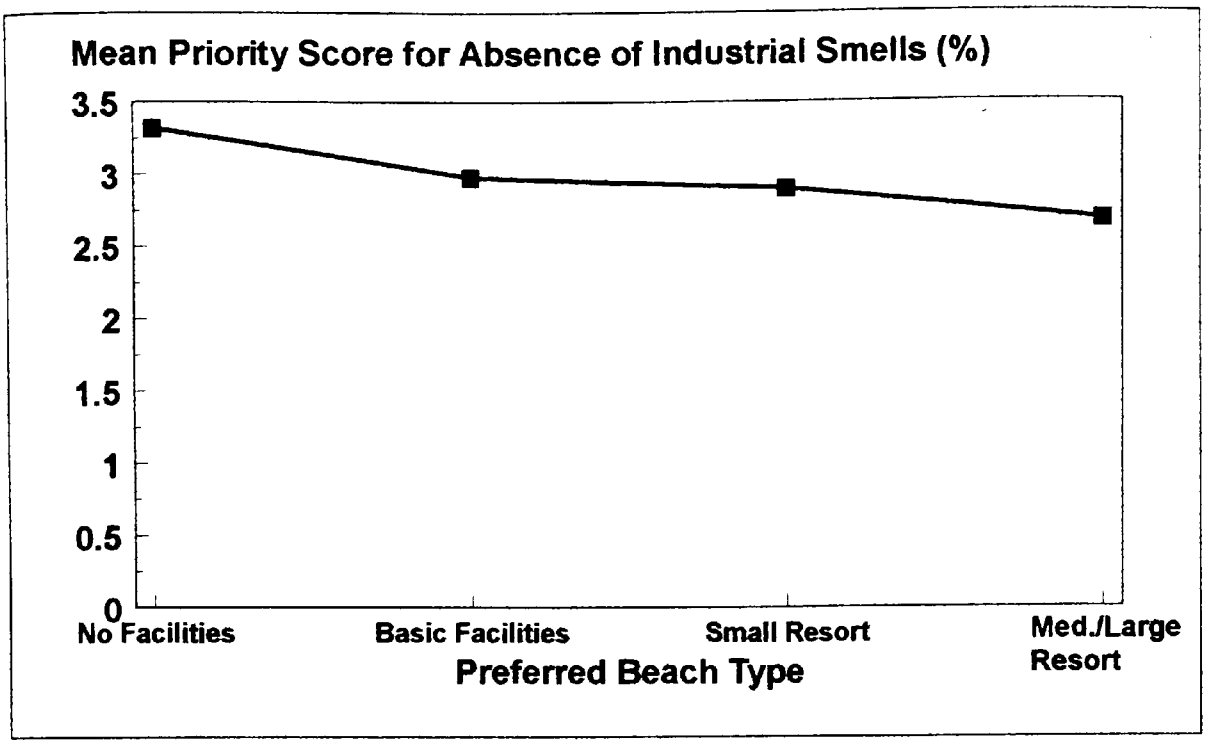


Fig. 6.32 Priority for Absence of Industrial Smells According to Preferred Beach Type

Absence of Traffic/Vehicle Fumes

As with industrial smells/odours, priority level for absence of traffic/vehicle fumes was highest for those preferring undeveloped beaches (Fig. 6.33).

Absence of Noise from Industry/Commerce; Absence of Vehicle Noise

Priority given to both these parameters showed similar relationships (Figs. 6.34 and 6.35), with multiple regression analysis showing higher priority associated with preference for visiting undeveloped beaches.

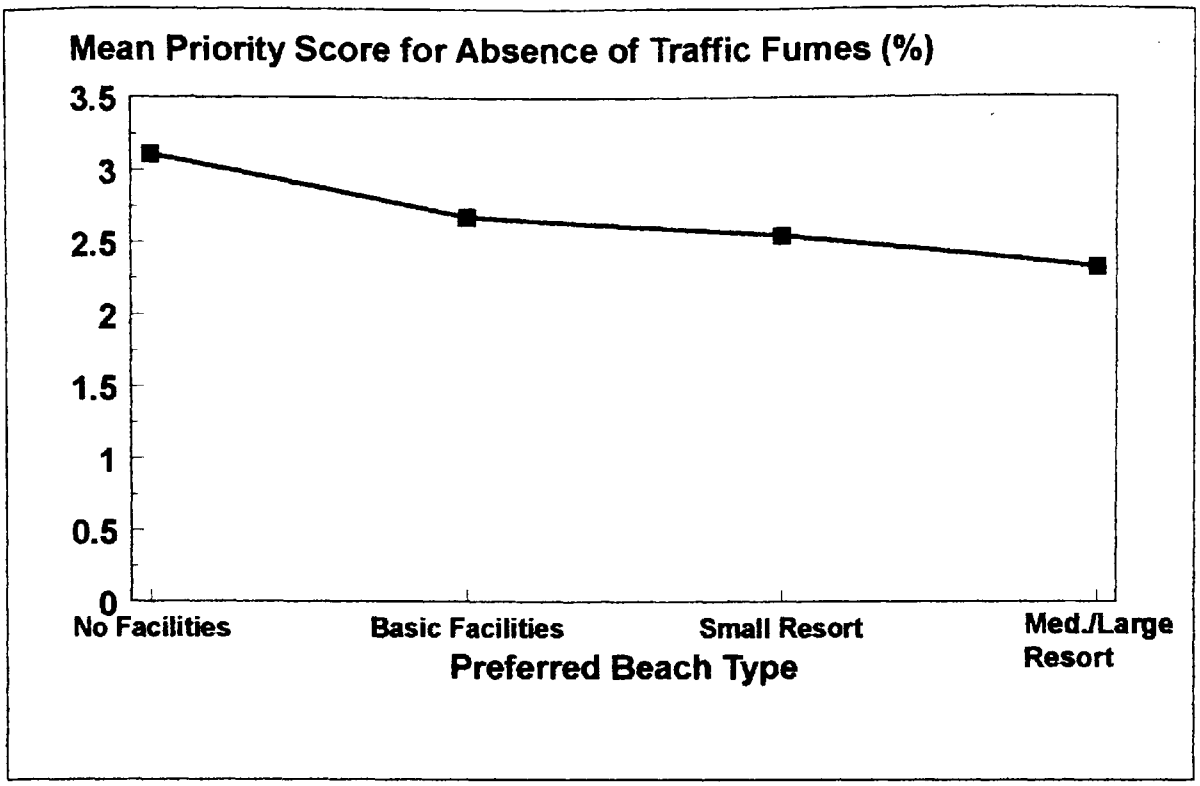


Fig. 6.33 Priority for Absence of Traffic Fumes According to Preferred Beach Type

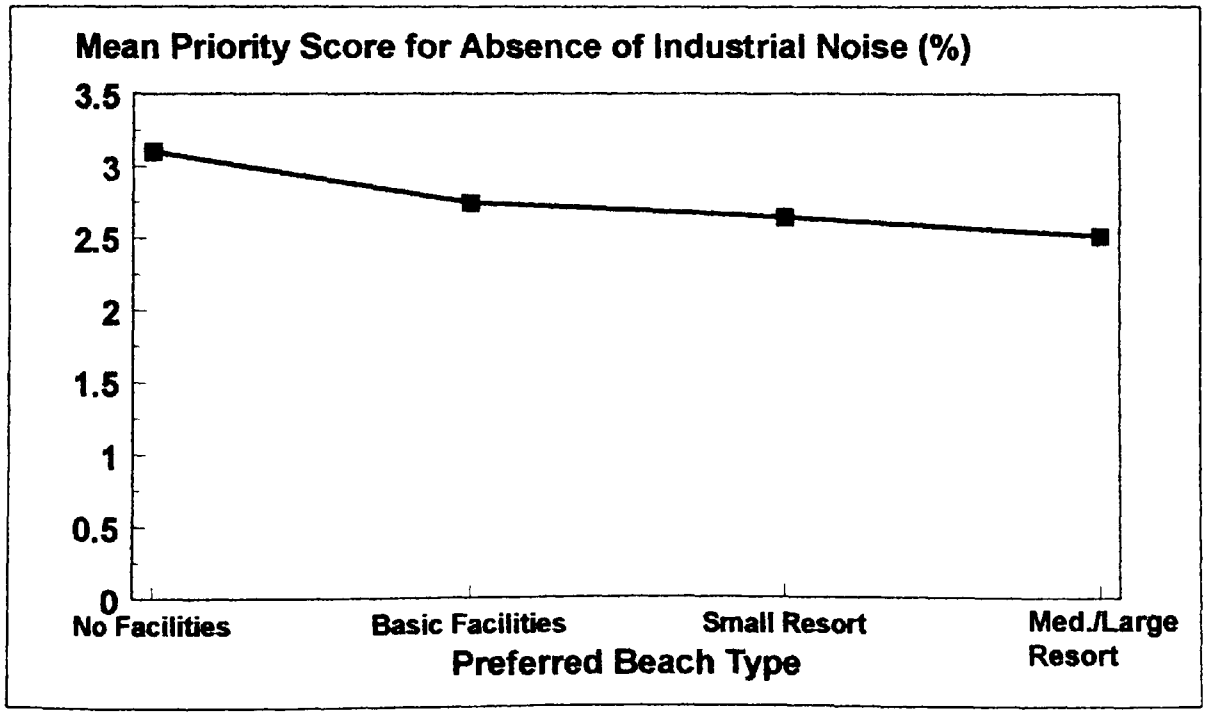


Fig. 6.34 Priority for Absence of Industrial Noise According to Preferred Beach Type

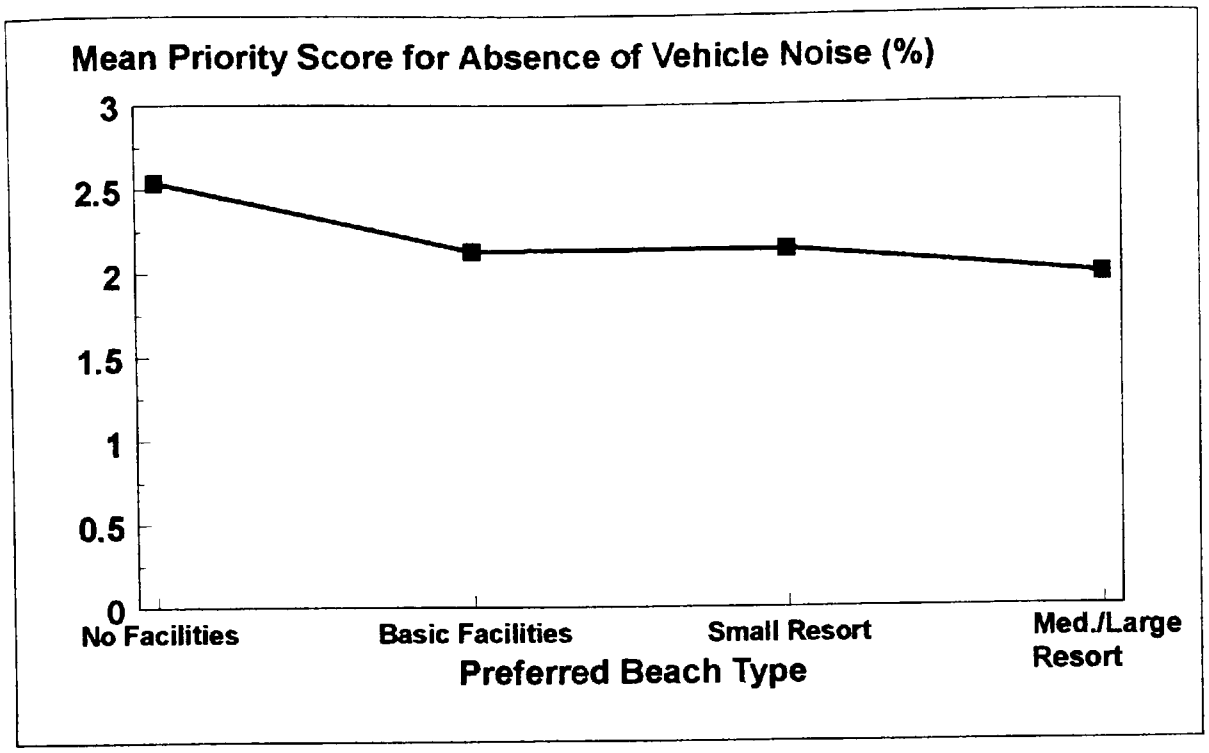


Fig. 6.35 Priority for Absence of Vehicle Noise According to Preferred Beach Type

Beach Flora

A trend in priority for presence of interesting beach flora with variation in preferred beach type is not completely clear from Fig. 6.36. However, multiple regression analysis demonstrated that those preferring undeveloped beaches tended to give higher priority to this factor.

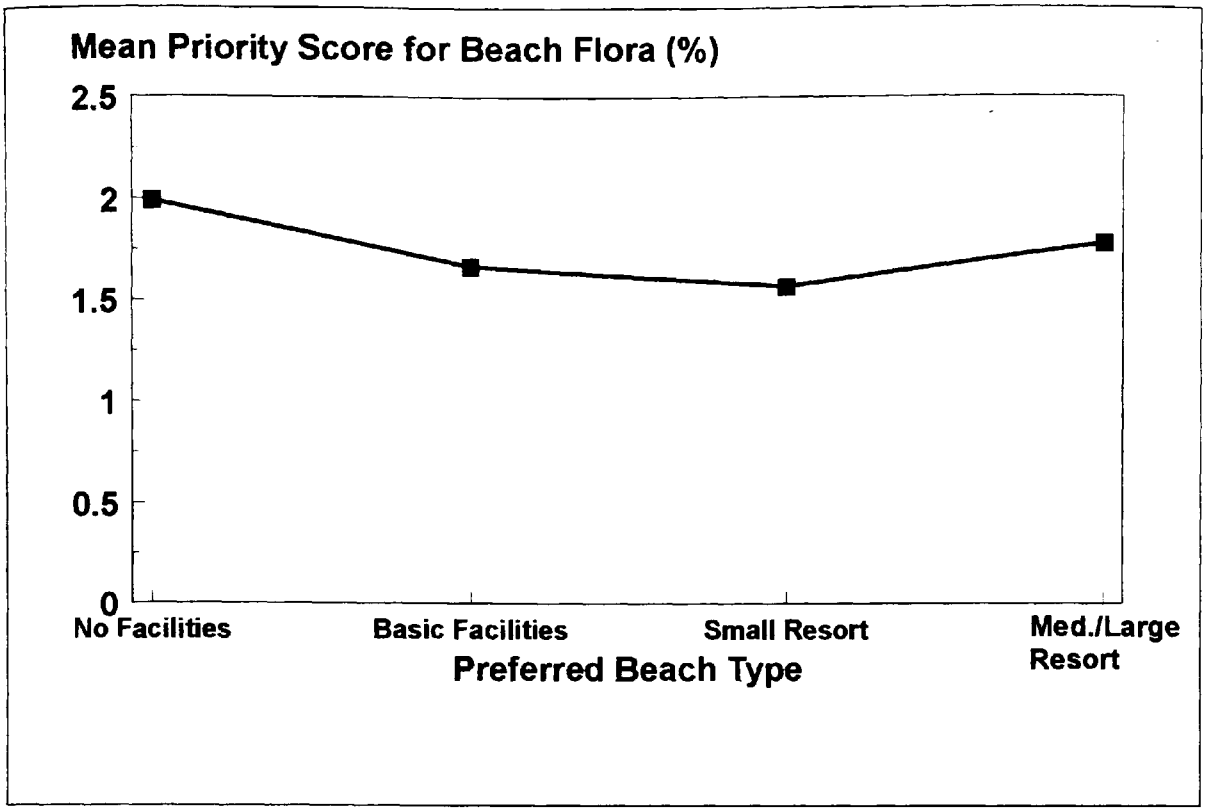


Fig. 6.36 Priority for Presence of Beach Flora According to Preferred Beach Type

Rock Pools

Priority for presence of rock pools was also shown by multiple regression analysis to be greater among users preferring undeveloped beaches (Fig. 6.37). As for the previously discussed factor (beach flora), an interest in the natural features of the beach environment as opposed to a preference for visiting the man-influenced, developed resort beaches could be considered to be reflected in this trend.

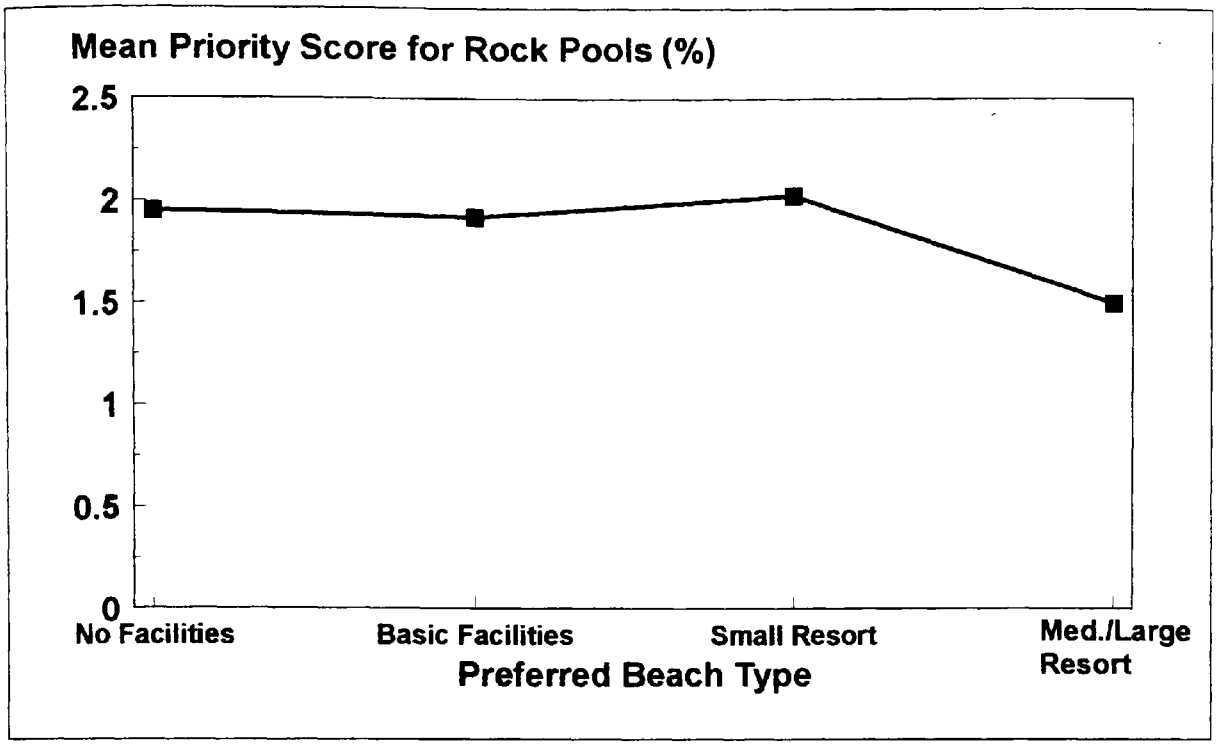


Fig. 6.37 Priority for Presence of Rock Pools/Shore Fauna According to Preferred Beach Type

Other Beach Factors Given Higher Priority by those Preferring Less Commercialised Beaches

Water clarity and absence of oil contamination were also shown by multiple regression analysis to be related to preferred beach type, with those preferring undeveloped beaches giving higher priority to these factors. Such visitors also gave higher ranking in Part 4 of the questionnaire to "Sand and Water Quality" than those preferring more commercialised beaches.

Presence of Toilet Facilities

Availability of toilet facilities at the beach was, not surprisingly, given lowest priority by beach users stating a preference for visiting beaches with no visitor facilities (Fig. 6.38; 1.93% compared to 2.66% - 2.88%). Multiple regression analysis again demonstrated the statistical validity of this difference.

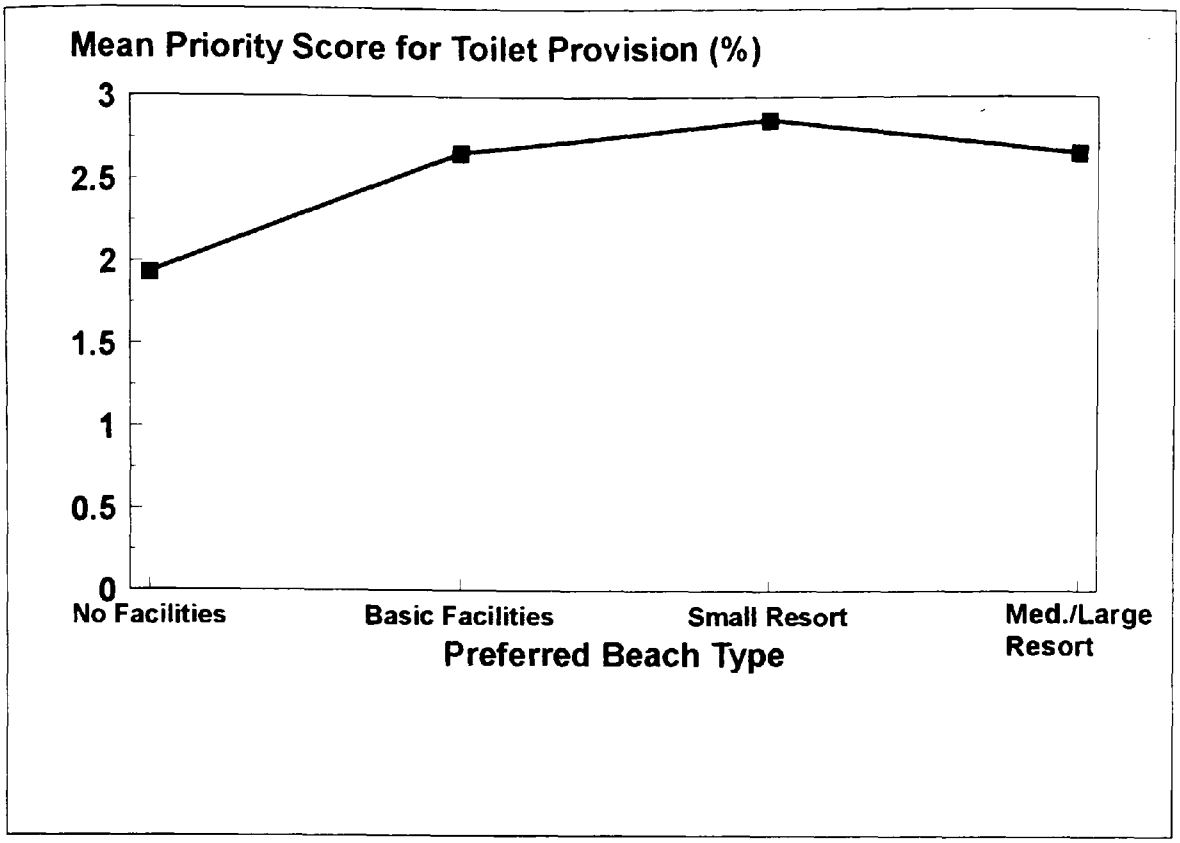


Fig. 6.38 Priority for Provision of Toilets According to Preferred Beach Type

Presence of Lifeguards

The statistical validity of the trend in priority level for lifeguard cover implied in Fig. 6.39, was confirmed by multiple regression analysis. The most distinct difference in priority level was between those preferring beaches with no visitor facilities (implying a desire for absence of human intervention), and the other categories (1.62% compared to 2.13% - 2.40%).

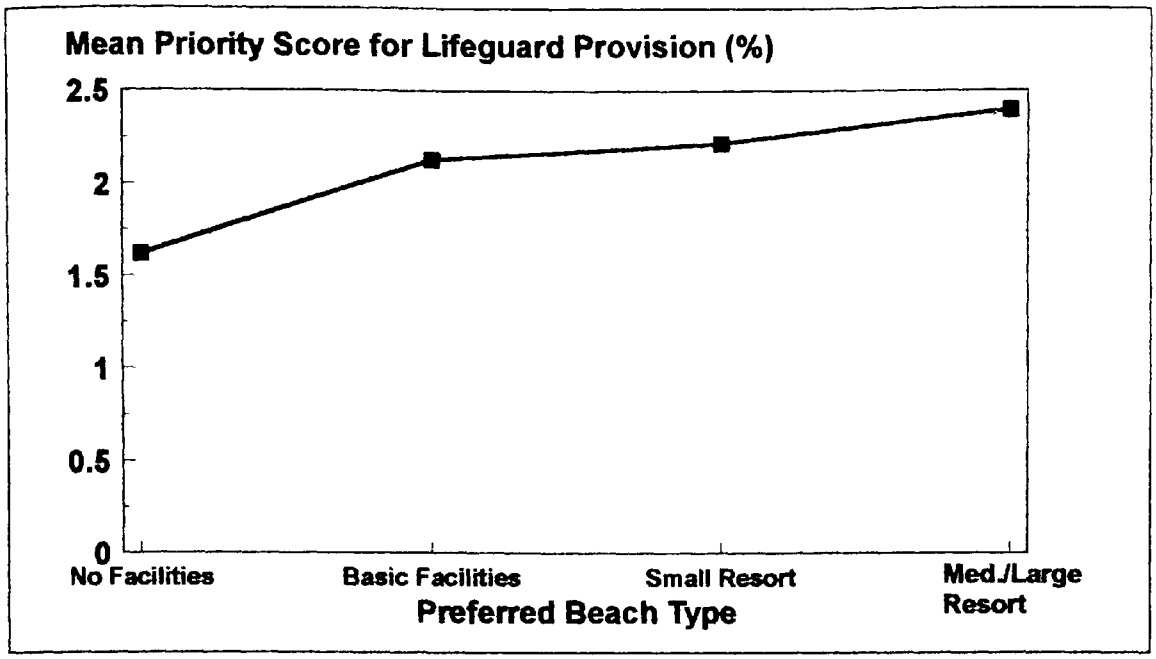


Fig. 6.39 Priority for Provision of Lifeguards According to Preferred Beach Type

Presence of Drinking Water/Washing Facilities

Visitors stating a preference for visiting more developed beaches gave higher priority to availability of drinking water and washing facilities (Fig. 6.40).

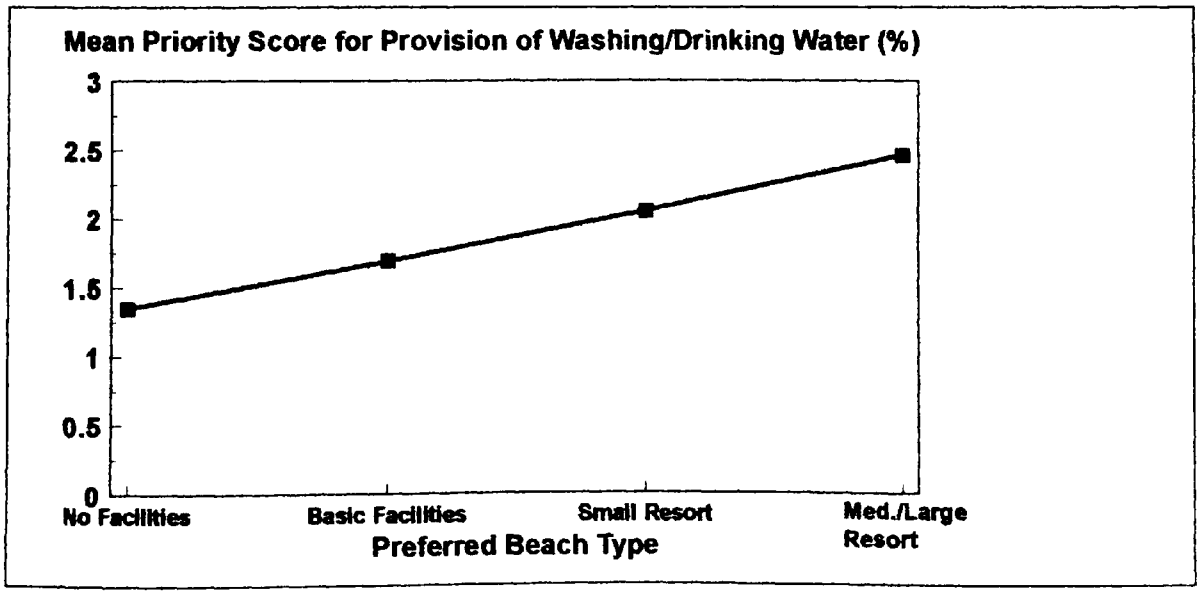


Fig. 6.40 Priority for Provision of Washing/Drinking Water According to Preferred Beach Type

Absence of Smells of Seaweed/Fishy Smells

In contrast to the trends for other (essentially man-made) smells/odours, lower priority for absence of seaweed/fishy smells was given by those preferring less developed beaches (Fig. 6.41).

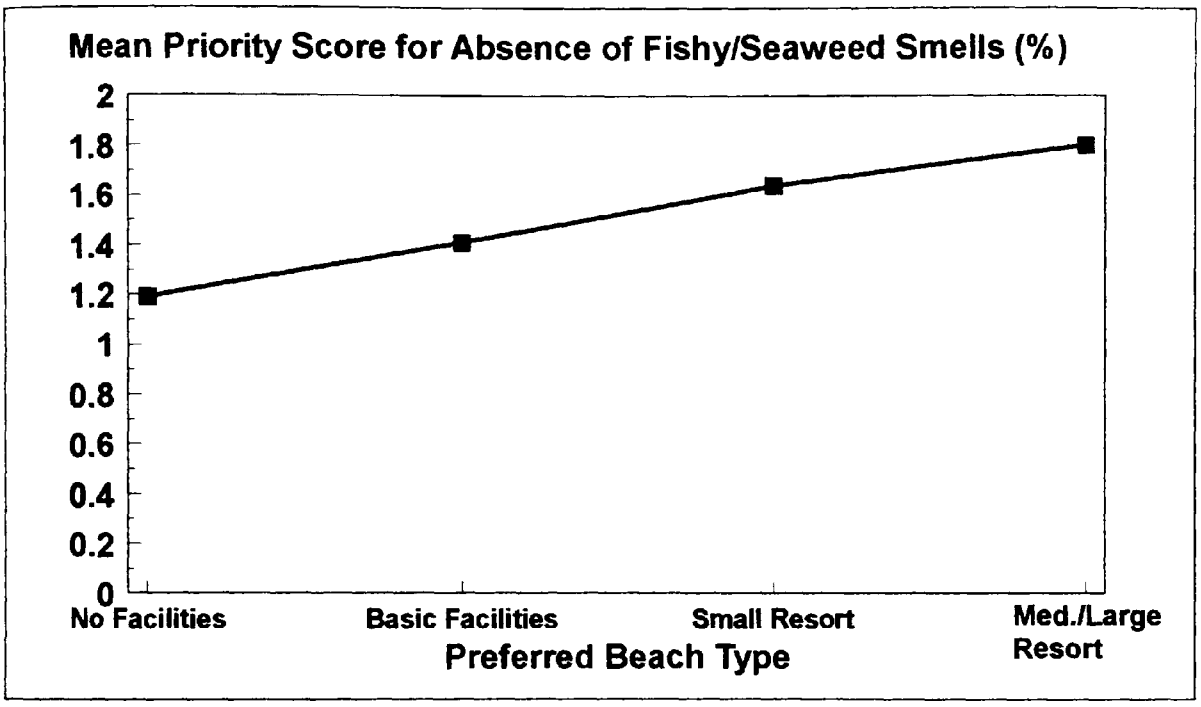


Fig. 6.41 Priority for Absence of Rotting Fish/Seaweed Smells According to Preferred Beach Type

Absence of Seaweed

Absence of seaweed on the beach was given lower priority by those preferring less commercialised beaches (Fig. 6.42). A connection between this factor and absence of seaweed/fishy smells (Fig. 6.41), may be suggested in terms of considering both to be forms of "natural pollution" of the beach environment. Those preferring a less commercially developed, more pristine beach environment may consider the presence of seaweed and associated smells as a natural feature of the coastline, expect it to be present and consider it inoffensive. Human-generated odours from industry, traffic, etc, would be likely to be viewed by such people in a very different way since they are indicators of

industrial/commercial intervention into, and pollution of, the natural environment. Those preferring more commercialised beaches may consider that the presence of smell of seaweed detracts from their image of a "clean", neat and managed beach environment in a fashion not dissimilar to the presence of man-made beach debris and odours.

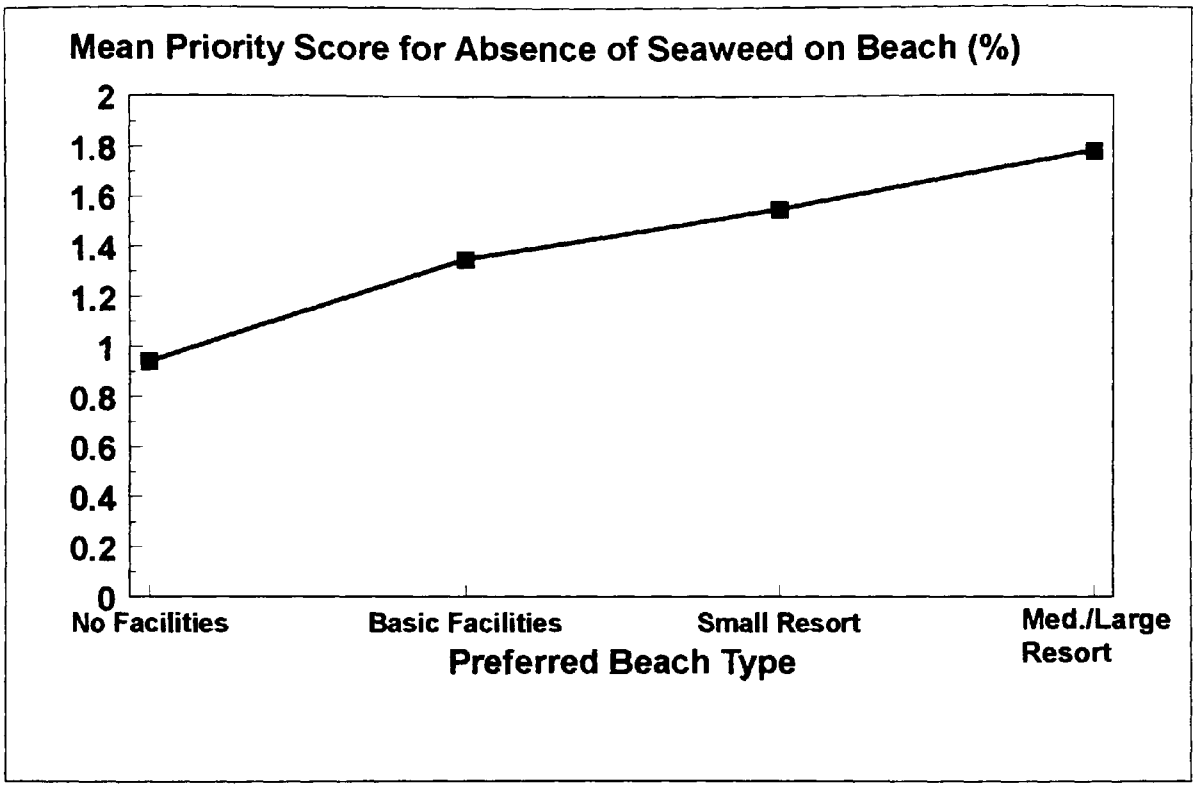


Fig. 6.42 Priority for Absence of Seaweed on the Beach According to Preferred Beach Type

Availability of Showers

Presence of shower facilities was a higher priority for beach users wishing to visit more commercialised beaches (Fig. 6.43).

Availability of Chairs/Sunbeds for Hire

As might be expected, there was a clear tend for those preferring more developed beaches to give higher priority to the availability of chairs/sunbeds (Fig. 6.44).

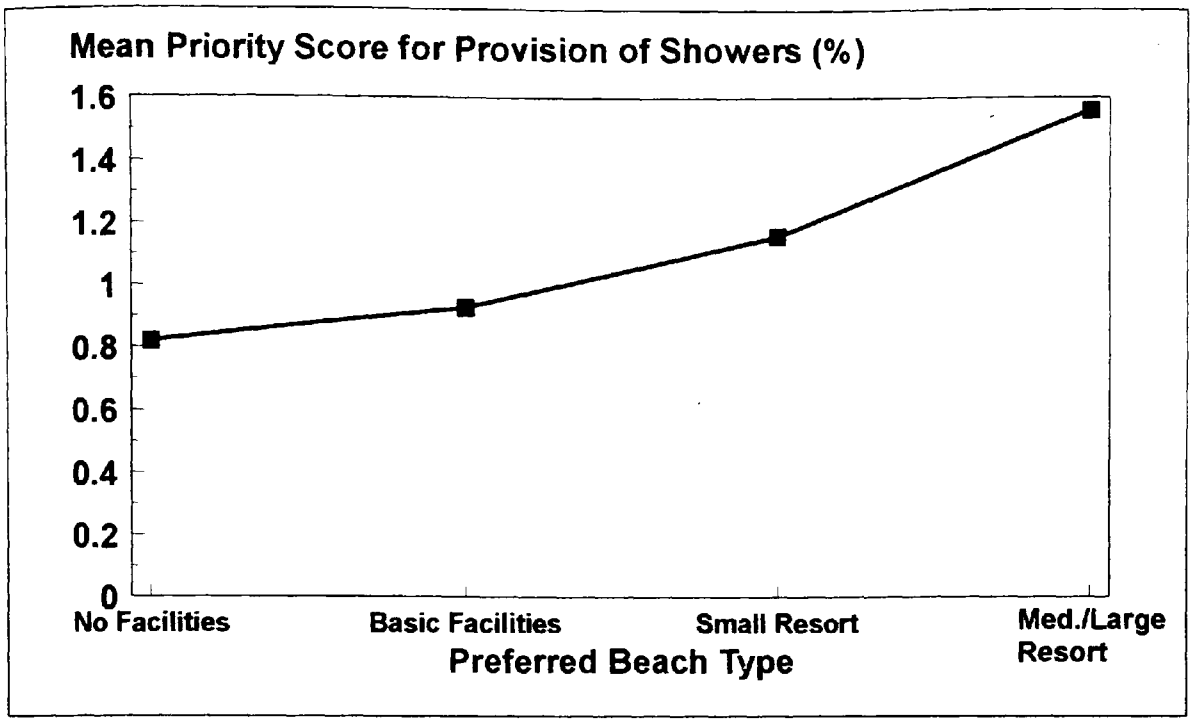


Fig. 6.43 Priority for Provision of Showers According to Preferred Beach Type

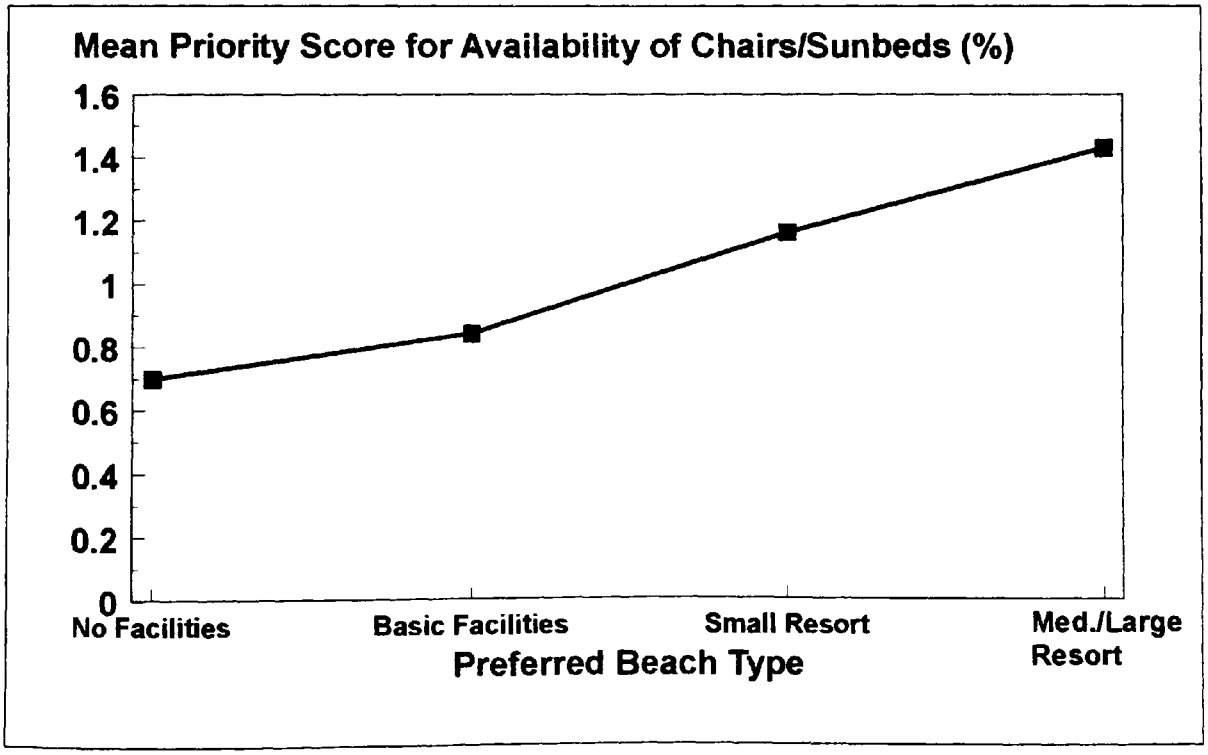


Fig. 6.44 Priority for Availability of Chairs/Sunbeds According to Preferred Beach Type

Other Beach Factors Given Higher Priority by those Preferring More Commercialised Beaches

In Part 4 of the questionnaire, those preferring to visit more commercialised beaches gave higher rankings to "Facilities" and "Access and Parking". As mentioned above, the presence of facilities for beach visitor use is implicit in the concept of the commercialised beach resort and is also made explicit in the descriptions of beach types featured in the questionnaire.

Potential Implications of Priority Variation According to Preferred Beach Type

The variations in priority scores according to preferred beach type described above suggest a contrast between those who choose to enjoy what might be termed the "natural attributes" of a beach and those who prefer traditional "beach resort" qualities. Higher priority was given to what might be loosely classified as "environment" based aspects by those stating a preference for uncommercialised beaches. Such aspects included scenery/landscape, beach flora and fauna (e.g. in rock pools), and absence of pollution in various guises such as beach litter, sewage debris, noise and unpleasant odours from industry and vehicles, oil contamination and bathing water pollution. These findings suggest the particular importance of maintaining high environmental standards with regard to these aspects, at less commercially developed beaches. Any development proposals in terms of improvement to existing amenities or provision of additional facilities at such beaches, should demand careful consideration of possible impacts on the beach features which currently seem to attract visitors to these sites. Additional investigations to examine in greater depth, the perceptions of beach visitors at undeveloped beaches should be undertaken to further elucidate the aspects described above, with the aim of guiding management of such beaches.

The beach aspects given higher priority by those stating preference for the more commercialised beach categories, could essentially be classified into four groups; climate at the beach/resort area, safety (including lifeguard provision), facilities, and access (including car parking). Climate is obviously outside the control of beach managers, but the fact that it is given higher priority by those

preferring more commercialised beaches could be of importance to tourist authorities in terms of promoting beaches in their area. A possible implication is that tourist authorities responsible for areas with modest climatic attributes from the beach tourism point of view, should focus promotional activity on those potential beach users who have less interest in this aspect of the beach environment. In terms of climatic characteristics, this may be regarded as applying to Wales and to a reasonably similar degree, the rest of the UK. Obviously, climatic considerations may be a significant reason why a potential Welsh beach user (one who perhaps visits beaches in other countries), might not visit beaches in Wales. Such a person would not therefore be sampled in a beach-based survey of the type undertaken in this study. This emphasises the importance of including perception studies of such potential (Welsh) beach users, in further studies attempting to relate user perceptions to general beach management policy making in Wales.

Bathing water safety is an aspect which management can only impinge upon through the provision of lifeguards and by regulating access to the water at dangerous areas/times. Again, the weakness of the survey conducted for this study was that beach users actually in the water, who might be expected to be most concerned about the safety of bathing, were not sampled. Other means of investigation of beach user perceptions would need to be employed in future studies into bathing water safety, to correct this deficiency.

In terms of facility provision, a stated preference for a more commercialised beach environment implies a high priority for availability of constructed facilities and supplied services at the beach. Higher priorities for availability of toilets, showers, drinking water and sunbeds for hire were demonstrated for beach users stating a preference for visiting more commercial beaches. The beach facets "Facilities" and "Access and Parking" (from Part 4 of the questionnaire), were also given higher priority by these beach users, suggesting that some people may prefer such beaches on the basis of knowledge of location, ease of access and the assurance that should they require a particular facility or service, it is likely to be present. Plans for additions and/or alterations to facilities and services at particular beaches

might benefit from further study of beach user priorities to assess which particular facilities (and of which type in terms of quantity/quality), existing and potential future users might require. The same considerations would apply to plans to modify access and parking arrangements.

6.2.3 Potential Value of Beach User Preference/Priority Investigations

All the above considerations with regard to variation in priorities between beach users preferring different beach types, would need to bear in mind the important differences in beach user preferences for many beach aspects which were discussed in Chapter 6.2.1. More detailed investigations of beach user perceptions, preferences and priorities, particularly with regard to those beach aspects which can be directly influenced by management, could provide a valuable resource for general policy decisions in CZM.

Studies extended to include other interest groups such as local residents, business owners/managers/franchisees at beaches and other beach users not sampled by a simple beach survey could also be used to support individual management decisions and longer term planning at particular beaches. A method which is currently gaining popularity and which could be used to investigate the perceptions of such groups, is that of "focus groups". These consist of 7 - 10 people from the population sub-group which it is desired to investigate. A facilitator leads a guided discussion into the subject area(s) which require investigation. As well as the ability to reach potential beach users who cannot be accessed via a beach questionnaire survey, this method could also be used to question other coastal stakeholders (e.g. local residents, business managers and policy makers themselves). It should also be possible using focus groups to obtain in-depth views on particular subject areas in a way which could not easily be achieved via a questionnaire. Subjects for examination in such a way might include perceptions of bathing water quality, litter, tourism development and beach awards/recommendations.

By means of surveying a large number of beach users at an individual beach or number of beaches in a particular area, information could be gathered in sufficient detail to confidently employ for support of decision making at that particular beach/area. Input from beach users gained via questionnaire surveys and other methods could therefore be interpreted by management and "fed back" to the beach environment via management decisions, for the direct benefit of the beach users themselves. Hence beach users could be engaged in the decision making process as desired by Orbach (1996), via a system which involved coastal researchers, policy makers and end users. Detailed management information could be assembled on the perceptions, preferences and priorities of visitors to different beaches in an area, of visitors from different areas/countries, and of different social classes, ages, etc.

In summary, it can be said that further studies in the field of beach user perception hold great promise for the future of CZM from the end-user's viewpoint. They offer the possibility of providing a valuable resource to help beach managers assess the needs of beach users, assist management in providing an improved service to tourists and help tourist authorities to promote their beaches to existing and desired future potential users.

6.3 Results of Landscape/Scenery Assessment

Mean scores out of 20 ranged from 16.1 (Broadhaven in S. Pembrokeshire; 80%) to 3.8 (Prestatyn; 19%; Table 6.8). Clamp (1976) found that response to landscape was largely determined by the attitude of individuals to the permanent features in the view presented and was little influenced by effects of weather or lighting. However in this study, cloud cover at time of filming had a significant effect ($p = 0.00$) on scoring, with higher scores observed for beaches filmed under sunny conditions. Since weather is a temporally variable aspect of beaches, a correction was applied to calculate a corrected mean score for scenic beauty, which might be expected if all the beaches had been filmed in similar weather conditions.

	Beach	Raw Score	Corrected Score		Beach	Raw Score	Corrected Score
1	Broadhaven (S. Pembs.)	16.96	**16.06**	36	Broad Haven	11.58	**10.42**
2	Caerfai	16.21	**15.05**	37	Fairbourne	11.29	**10.39**
3	Barafundle	15.92	**15.02**	38	Ogmore	11.25	**10.35**
4	Marloes	15.79	**14.89**	39	Abereiddi	11.50	**10.34**
5	Three Cliffs Bay	15.67	**14.77**	40	Llandudno - North East	9.04	**10.31**
6	Morfa Bychan	12.83	**14.10**	41	Newgale	11.42	**10.26**
7	Rhossili	14.79	**13.89**	42	Swansea	8.67	**9.94**
=8	Manorbier	12.42	**13.69**	43	Trearddur Bay	8.63	**9.90**
=8	Newport	12.42	**13.69**	=44	Barmouth	10.75	**9.85**
10	Mwnt	14.54	**13.64**	=44	Rest Bay (Porthcawl)	10.75	**9.85**
11	Llandanwg	12.04	**13.31**	46	Borth	10.67	**9.77**
12	Llangranog	14.08	**13.18**	=47	Rhosneigr - North	8.42	**9.69**
13	Southerndown	13.75	**12.85**	=47	Langland	8.42	**9.69**
14	Aberdyfi	13.58	**12.68**	49	Cold Knap (Barry)	8.33	**9.60**
15	Harlech	13.42	**12.52**	50	Aberaeron	8.29	**9.56**
16	Pembray	11.13	**12.40**	51	Lydstep	10.42	**9.52**
=17	St. Mary's Well Bay	10.04	**12.31**	52	Dinas Dinlli	8.21	**9.48**
=17	Caswell	11.04	**12.31**	53	Llantwit Major	10.08	**9.18**
19	Whitesands Bay	13.42	**12.26**	=54	Aberystwyth - South	7.87	**9.14**
20	Rhosneigr - Traeth Llydan	10.96	**12.23**	=54	Amroth	10.04	**9.14**
21	Nash	12.96	**12.06**	56	Tywyn	7.38	**8.65**
22	Pendine	10.54	**11.81**	57	Wiseman's Bridge	9.50	**8.60**
=22	Jackson's Bay (Barry)	10.54	**11.81**	58	Newton (Porthcawl)	9.08	**8.18**
24	Freshwater East	12.88	**11.72**	59	Aberystwyth - North	6.83	**8.10**
25	Poppit Sands	12.29	**11.39**	60	Cricceith	6.79	**8.06**
26	New Quay	12.21	**11.31**	61	Benllech	8.92	**8.02**
27	Tenby - North Beach	12.04	**11.14**	62	Pwllheli	6.54	**7.81**
28	Colwyn Bay	9.75	**11.02**	63	Rhyl	6.50	**7.77**
29	Bracelet	9.83	**11.01**	64	Saundersfoot	8.42	**7.52**
30	Port Eynon	11.79	**10.89**	65	Whitmore Bay (Barry)	6.17	**7.44**
31	Oxwich	9.38	**10.65**	66	Abersoch	6.50	**5.60**
32	Llandudno - West	11.46	**10.56**	67	Trecco Bay (Porthcawl)	5.96	**5.06**
33	Kinmel Bay	9.25	**10.52**	=68	Aberafan	5.75	**4.85**
34	Tenby - South Beach	11.37	**10.47**	=68	Sandy Bay (Porthcawl)	5.75	**4.85**
35	Mumbles	9.17	**10.44**	70	Prestatyn	4.96	**3.80**

Table 6.8 Corrected Mean Landscape Scores (out of 20) in Rank Order

The method of correction was similar to that used to eliminate seasonal variation in time series analysis:

$S_c = S_r - (X_w - X)$, where;

S_c = corrected mean score for beach,
S_r = raw mean score for beach,
X_w = mean of mean scores for beaches in same group with respect to weather conditions,
X = mean of mean scores for all beaches.

This correction was applied for final score calculation and ranking (Table 6.8). Wave height, number of people present on the beach and position of filmed panorama on the final tape were not shown to have significant effects on mean scores ($p < 0.05$). Analysis of corrected scores by stepwise multiple regression, revealed a strong preference among viewers for beaches with few man-made structures visible in the panorama ($p = 0.00$; Fig. 6.45). Particularly noteworthy was the fact that the five beaches with the highest corrected scores were in the lowest group (1) for prominence of man-made structures, while the three beaches with the lowest corrected scores were in the highest such group (5; Table 6.9). Also, five of the top six rated beaches were of beach type 1 ("no facilities"), in terms of level of commercialisation (Table 6.9).

The results obtained in this study show the need for further work to examine beach scenery/landscape preferences of actual beach user groups (rather than the "experts" who judged beaches in this study). Examination of preference variations according to socio-demographic characteristics also needs to be carried out. A more detailed study of the effect of built structures on beach scenery/landscape assessment could investigate aspects such as sea walls, groynes and buildings of different scale and character on perceived scenic quality. Such studies could have important input into the coastal planning process where proposals are being considered which could have an effect on coastal scenic quality.

	Beach	Corrected Score	Prominence of man-made structures from 1 (low) to 5 (high)	Beach commercial level (1 = no facilities, 4 = medium/large resort)
1	Broadhaven (S. Pembs.)	16.06	1	1
2	Caerfai	15.05	1	2
3	Barafundle	15.02	1	1
4	Marloes	14.89	1	1
5	Three Cliffs Bay	14.77	1	1
6	Morfa Bychan	14.10	2	1
7	Rhossili	13.89	2	2
=8	Manorbier	13.69	2	2
=8	Newport	13.69	3	2
10	Mwnt	13.64	1	1
11	Llandanwg	13.31	2	2
12	Llangranog	13.18	3	3
13	Southerndown	12.85	2	3
14	Aberdyfi	12.68	3	3
15	Harlech	12.52	2	2
16	Pembray	12.40	1	2
=17	St. Mary's Well Bay	12.31	1	2
=17	Caswell	12.31	3	2
19	Whitesands Bay	12.26	2	2
20	Rhosneigr - Traeth Llydan	12.23	2	1
21	Nash	12.06	1	2
22	Pendine	11.81	3	3
=22	Jackson's Bay (Barry)	11.81	2	4
24	Freshwater East	11.72	3	2
25	Poppit Sands	11.39	2	2
26	New Quay	11.31	2	4
27	Tenby - North Beach	11.14	4	3
28	Colwyn Bay	11.02	3	3
29	Bracelet	11.01	3	2
30	Port Eynon	10.89	2	3
31	Oxwich	10.65	3	3
32	Llandudno - West	10.56	3	3
33	Kinmel Bay	10.52	3	2
34	Tenby - South Beach	10.47	3	4
35	Mumbles	10.44	4	4
36	Broad Haven	10.42	4	3
37	Fairbourne	10.39	3	2
38	Ogmore	10.35	3	3
39	Abereiddi	10.34	3	2

	Beach	Corrected Score	Prominence of man-made structures from 1 (low) to 5 (high)	Beach commercial level (1 = no facilities, 4 = medium/large resort)
40	Llandudno - North East	10.31	5	4
41	Newgale	10.26	3	2
42	Swansea	9.94	4	4
43	Trearddur Bay	9.90	3	2
=44	Barmouth	9.85	4	4
=44	Rest Bay (Porthcawl)	9.85	3	1
46	Borth	9.77	4	3
=47	Rhosneigr - North	9.69	4	2
=47	Langland	9.69	4	3
49	Cold Knap (Barry)	9.60	3	2
50	Aberaeron	9.56	3	3
51	Lydstep	9.52	3	3
52	Dinas Dinlli	9.48	3	3
53	Llantwit Major	9.18	3	3
=54	Aberystwyth - South	9.14	4	4
=54	Amroth	9.14	4	3
56	Tywyn	8.65	4	3
57	Wiseman's Bridge	8.60	3	2
58	Newton (Porthcawl)	8.18	3	2
59	Aberystwyth - North	8.10	4	4
60	Cricceith	8.06	5	3
61	Benllech	8.02	3	3
62	Pwllheli	7.81	4	2
63	Rhyl	7.77	5	4
64	Saundersfoot	7.52	4	4
65	Whitmore Bay (Barry)	7.44	4	4
66	Abersoch	5.60	4	3
67	Trecco Bay (Porthcawl)	5.06	3	4
=68	Aberafan	4.85	5	4
=68	Sandy Bay (Porthcawl)	4.85	5	4
70	Prestatyn	3.80	5	3

Table 6.9 Landscape Scores in Relation to Prominence of Structures and Beach Type

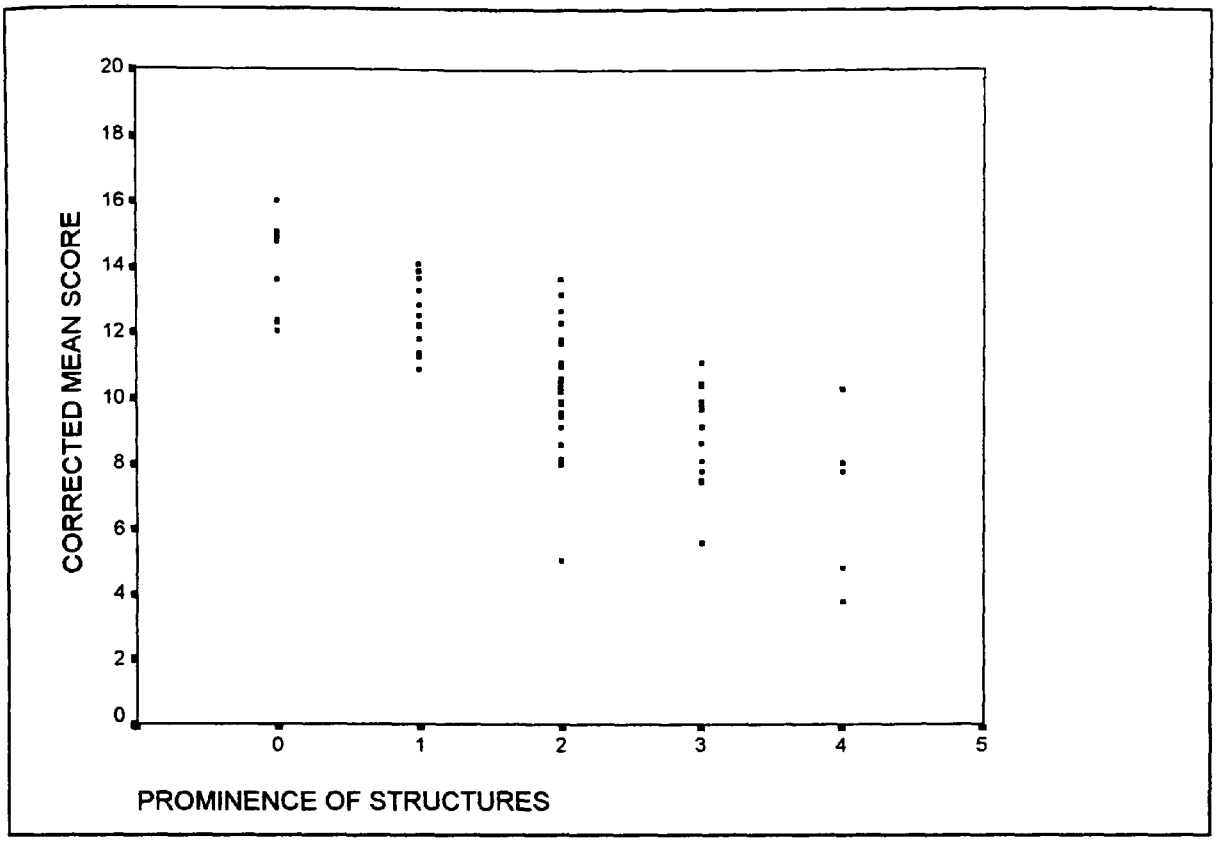


Fig. 6.45 Plot of Corrected Mean Landscape Score Against Prominence of Structures

6.4 Overall Rating Scores

The checklist factor relating to abundance of bird life (Appendix 13) was omitted from scoring due to difficulty of assessment and the large temporal variability of bird abundance observed in the vicinity of the study beaches. Regarding scoring of the factor relating to harmful/dangerous animals, no reliable data was obtainable for most of the study beaches. This factor was included in calculation of beach scores on the basis that all investigated beaches were free from such hazards, i.e. the maximum score was given to all beaches for this factor. Forty seven factors were finally taken into account in calculating rating scores for the 70 featured beaches. These scores are shown in descending order in Table 6.10.

Beach	EC beach (√)	Total %	Beach	EC beach (√)	Total %
Broadhaven (S. Pembs.)		69	Wiseman's Bridge		57
Pembray	√	69	Dinas Dinlli	√	57
Mwnt		67	Cold Knap (Barry)	√	56
Caswell Bay	√	66	Llandudno - West	√	56
Tenby - South		66	Kinmel Bay	√	56
Barafundle Bay		65	Caerfai Bay		56
Freshwater East		64	Pwllheli	√	56
Langland Bay	√	64	Tywyn	√	55
Whitesands Bay	√	64	Harlech	√	55
Tenby - North	√	64	Fairbourne	√	55
Newgale Sands	√	63	Pendine	√	55
Port Eynon	√	63	Morfa Bychan	√	55
Bracelet Bay	√	62	Llandudno - North	√	54
Marloes Sands		62	Benllech	√	54
Llangranog		62	Mumbles		53
Saundersfoot	√	62	Jackson's Bay (Barry)	√	53
Poppit Sands		61	Rhossili	√	53
Whitmore Bay (Barry)	√	61	Borth	√	53
Rhosneigr - Traeth Llydan	√	61	Aberystwyth - South	√	52
Abereiddy Bay		60	Southerndown	√	52
Newport Sands	√	60	Aberystwyth - North	√	50
Aberdyfi	√	60	Criccieth	√	49
Barmouth	√	60	Lydstep Haven		48
Llandanwg	√	60	Colwyn Bay	√	48
Swansea Bay	√	60	St. Mary's Well Bay (Barry)		48
Abersoch	√	60	Rest Bay (Porthcawl)	√	48
Manorbier		60	Ogmore by Sea		47
Three Cliffs Bay		59	Prestatyn	√	47
Rhyl	√	58	Newton Bay (Porthcawl)		46
New Quay	√	58	Nash		46
Rhosneigr - Traeth Crigyll		58	Sandy Bay (Porthcawl)	√	45
Amroth	√	58	Llantwit Major		45
Trearddur Bay	√	57	Aberafan	√	45
Broad Haven	√	57	Aberaeron	√	44
Oxwich	√	57	Trecco Bay (Porthcawl)	√	39

Table 6.10 Percentage Rating Scores in Ranking Order

In terms of beach ratings, the four factors concerning climate in the beach resort area (sunshine, rainfall, temperature and wind speed), accounted for a mean of 8.2% of the total beach rating score. Four factors relevant to bathing safety accounted for a mean of 8.3% of the rating score. "Physical" factors (including landscape/scenery - 14.0% - and safety) accounted for 39.2% of the beach rating, compared to 19.6% for the "biological" factors and 41.2% for "human use" factors. These percentages for "physical", "biological" and "human use" groupings, were remarkably similar to those in the checklist used by Williams *et al.*, (1993b; 35%, 21% and 44% respectively).

Broadhaven near Bosherton in South Pembrokeshire and Pembray (Cefn Sidan) achieved the highest overall beach rating scores, 69% (Tables 6.10 & 6.11). Clearly the lowest overall beach score was that for Trecco Bay, Porthcawl (39%). It was noteworthy that the highest scoring beaches in each of the 4 categories of commercialisation (Broadhaven - no facilities - 69%; Pembray - beach with basic facilities - 69%; Langland Bay - small resort - 64%; Tenby South - medium/large resort - 66%; Tables 6.11, 6.13, 6.14 and 6.15 respectively), achieved fairly similar scores. This suggested that the scoring system employed based on beach user preferences and priorities was able to generate broadly similar, high scores for beaches meeting the requirements of visitors wishing to go to beaches of all levels of commercialisation.

Beach	Total %
Broadhaven (S. Pembs)	69
Mwnt	67
Barafundle	65
Marloes	62
Rhosneigr -Traeth Llydan	61
Three Cliffs Bay	59
Morfa Bychan	55
Rest Bay (Porthcawl)	48

Table 6.11 Percentage Rating Scores for Beaches with No Facilities

Table 6.12 shows a breakdown of percentage scores for the 70 rated beaches into the sub-divisions of "physical", "biological" and "human use" categories. Percentages for "physical" factors ranged from 63% (Barafundle Bay), to 29% (Prestatyn). "Biological" factors ranged from 92% (Marloes Sands), down to 17% for Aberaeron, while "human use" factors ranged from 86% at Pembray to 40% at Lydstep Haven. The high score for "physical" factors at Barafundle Bay can be attributed to maximum scores for beach width (20 - 50 m at high tide, 50 - 200 m at low tide), the fact that the beach was entirely covered with light tan coloured sand, the presence of some shelter from breezes (the most preferred option for beach exposure), the gentle beach slope, absence of submerged rocks and other obstacles and above all, the high score (75%) for scenery/landscape.

Prestatyn scored only 29% for "physical" beach factors (Table 6.12). The main reason for this was the fact that it had easily the lowest score for beach scenery/landscape (19%). For beaches with "small resort" type facilities, scenery/landscape accounted for 51% of the beach score for "physical" factors, so the low scenery/landscape score had a great influence on the overall score for "physical" factors. Other contributory factors to the low score were the fact that the beach effectively disappeared at high tide, its exposed nature, the presence of many stone groynes and the brownish sand colour.

At Marloes, there was a score of 92% for "biological" factors (Table 6.12). This very high score was mainly attributable to the presence of interesting flora and fauna at the beach, (near) absence of sewage debris and bathing water falling, in 1994 (MCS, 1995), into the highest quality category used (Table 2.3). In contrast at Aberaeron, which scored 17% for "biological" factors (Table 6.12), the bathing water failed in 1994 to reach the minimum "pass" standard required by the EC Bathing Waters Directive (76/160/EEC; Tables 2.1 & 2.3). At the time of completing the checklist, sewage debris on the beach and floating debris in the sea were found to be abundant, there was a strong smell of rotting fish/seaweed, much seaweed was washed up on the beach, and interesting beach fauna/flora were absent.

Beach	Beach Type (as in Chapter 5.3.2)	% Score			Total %
		Physical	Biological	Human Use	
St. Mary's Well Bay	b	45	31	59	48
Jackson's Bay (Barry)	d/e	37	55	65	53
Whitmore Bay (Barry)	d/e	39	55	83	61
Cold Knap (Barry)	b	36	60	73	56
Llantwit Major	c	31	62	50	45
Nash	b	36	48	54	46
Southerndown	c	38	56	62	52
Ogmore	c	36	47	56	47
Newton Bay (Porthcawl)	b	38	44	54	46
Trecco Bay (Porthcawl)	d/e	35	44	43	40
Sandy Bay (Porthcawl)	d/e	35	49	43	41
Rest Bay (Porthcawl)	a	36	61	54	48
Aberafan	d/e	34	52	52	45
Swansea Bay	d/e	48	68	67	60
Mumbles	d/e	40	62	60	53
Bracelet Bay	b	47	72	74	62
Langland Bay	c	48	66	77	64
Caswell Bay	b	49	80	76	66
Three Cliffs Bay	a	55	51	66	59
Oxwich	c	51	65	58	57
Port Eynon	c	51	64	73	63
Rhossili	b	49	61	53	53
Pembray	b	51	72	86	69
Pendine	c	41	70	60	55
Amroth	c	41	74	67	58
Wiseman's Bridge	b	40	68	69	57
Saundersfoot	d/e	45	68	73	62
Tenby - North	c	52	66	74	64
Tenby - South	d/e	50	84	73	66
Lydstep Haven	c	44	74	40	48
Manorbier	b	46	88	61	60
Freshwater East	b	52	82	67	64
Barafundle Bay	a	63	63	67	65
Broadhaven (S. Pembs.)	a	61	77	74	69
Marloes Sands	a	52	92	58	62

Beach	Beach Type (as in Chapter 5.3.2)	% Score			Total %
		Physical	Biological	Human Use	
Broad Haven	c	51	49	66	57
Newgale Sands	b	44	69	78	63
Caerfai Bay	b	48	65	60	56
Whitesands Bay	b	40	74	83	64
Abereiddi Bay	b	43	83	65	60
Newport Sands - North	b	47	65	70	60
Poppit Sands - West	b	42	73	75	61
Mwnt	a	53	79	75	67
Llangranog	c	43	77	73	62
New Quay	d	40	67	70	58
Aberaeron	c	37	17	64	44
Aberystwyth - South	d	42	35	69	52
Aberystwyth - North	d	39	38	64	50
Borth	c	33	70	63	53
Aberdyfi	c	53	74	60	60
Tywyn	c	39	62	68	55
Fairbourne	b	43	71	58	55
Barmouth	d	44	73	67	60
Llandanwg	b	45	64	73	60
Harlech	b	49	61	59	55
Morfa Bychan	a	54	57	55	55
Criccieth	c	32	44	66	49
Pwllheli	b	45	68	60	56
Abersoch	c	42	78	69	60
Dinas Dinlli	c	35	81	66	57
Rhosneigr - Traeth Llydan	a	54	79	61	61
Rhosneigr - Traeth Crigyll	b	46	82	58	58
Trearddur Bay	b	50	80	53	57
Benllech	c	38	54	68	54
Llandudno - West	c	44	49	71	56
Llandudno - North	d/e	43	39	71	54
Colwyn Bay	c	36	49	58	48
Kinmel Bay	b	42	57	71	56
Rhyl	d/e	39	59	74	58
Prestatyn	c	29	42	66	47

Table 6.12 Percentage Rating Scores in Order of Position on Welsh Coast, with Percentages for Physical, Biological and Human Use Factors

Management at Pembray in terms of regulation of activities such as watersports, lifeguard provision and litter control contributed to Pembray's score of 86% for "human use" factors (Table 6.12), the highest in this study. Pembray scored 72% for "biological" factors, with bathing water quality meriting a "pass" of the EC Bathing Water Directive's "I" standard (76/160/EEC; Tables 2.1 & 2.3), and negligible seaweed or sewage debris present on the beach. Interesting flora was also accessible on the dunes immediately backing the beach. "Physical" factors rated 51%, a moderately good score in the context of this study. There was 100% cover of sand of a pleasant light tan colour and no submerged obstacles or dangerous cliffs were present.

Pembray attained an overall score of 69% (Tables 6.10 & 6.14), and may be seen as an example of a Welsh beach where a range of basic visitor facilities of good quality are provided without distracting from the unspoilt nature of the beach environment. Scenery/landscape was given a mean score of 62%. Despite the fact that the scenery itself at Pembray, being composed on a view of a long, convex beach backed by low dunes and conifers may have been considered by judges to be uninspiring, landscape "detractors" in terms of human-built structures were almost invisible. Odours and noise from industry, traffic and catering were absent or negligible, while facilities such as car parking (within 200 m), basic refreshments, showers and (almost) clean toilets were provided within close reach of the beach, but screened from view by dunes and/or trees.

At Lydstep Haven, the lowest score (40%; Table 6.12) for "human use" factors was recorded. The beach has the characteristics of a small resort, but most tourist facilities except for parking were provided only within the enclosure of a private holiday centre/caravan park. These facilities were not regarded as being available for convenient use by beach users not resident within the private holiday complex. Unpleasant traffic noise and fumes were however, generated by vehicles immediately at the rear of the beach, in front of the complex. Management of the beach itself appeared weak, with abundant litter, no lifeguards apparent and no regulation with regard to watersports, vehicles or dog access.

Beach	Total %
Pembray	69
Caswell	66
Freshwater East	64
Whitesands Bay	64
Newgale	63
Bracelet	62
Poppit Sands	61
Abereiddi	60
Newport Sands	60
Llandanwg	60
Manorbier	60
Rhosneigr - Traeth Crigyll	58
Trearddur Bay	57
Wiseman's Bridge	57
Cold Knap (Barry)	56
Kinmel Bay	56
Caerfai Bay	56
Pwllheli	56
Harlech	55
Fairbourne	55
Rhossili	53
St. Mary's Well Bay	48
Newton (Porthcawl)	46
Nash	46

Table 6.13 Percentage Rating Scores - Beaches with Basic Tourist Facilities

The overall score of 69% for Broadhaven (S. Pembs.), can be attributed to the high score for "physical" factors (especially scenery/landscape, for which it had clearly the highest score of 80%; Table 6.8), which at 61% was second only to Barafundle Bay, together with comparatively fairly good scores of 77% for "biological" factors and 74% for "human use" factors (Table 6.12). The "physical" characteristics of Broadhaven were somewhat similar to those of Barafundle Bay, with complete cover of light tan coloured sand, some shelter from wind, gentle beach slope and few water hazards. In terms of "biological" factors, sewage debris

amount fell into the lowest category (see Appendix 13), and seaweed and floating debris were absent or negligible. Water quality in 1994 satisfied the mandatory ("I") standards sufficient to comply with the EC Bathing Waters Directive (76/160/EEC; Tables 2.1 & 2.3). Although the beach had essentially the character of one at which no visitor facilities were provided, toilets were available within 100 m of the beach (albeit up a steep path). Environmental detractors in terms of noise/fumes from industry, traffic and commerce, and pollution from oil, sewage debris and litter on the beach, were absent or negligible. Broadhaven could be regarded as a prime example of a beach where as a result of careful management (by the National Trust), and development control, high standards of environmental and scenic quality have been maintained for the benefit of beach users preferring an uncommercialised, "natural" beach environment.

Trecco Bay at Porthcawl suffered the lowest overall score of any beach in this study (40%; Table 6.10). It scored 35% for "physical" beach factors, with 50% of the beach covered by cobbles at high water, high wind exposure and sand of a brownish colour. It scored only 25% for scenery/landscape (67th out of 70 beaches; Table 6.8), with residential caravans immediately overlooking the beach being prominently in view. Trecco Bay scored 44% for "biological" factors (Table 6.12). Although the beach achieved a 100% pass of "I" standards as set by the EC Bathing Waters Directive (76/160/EEC; Table 2.1), sewage debris (and indeed general litter), was abundant on the beach when visited to complete the checklist. Decaying seaweed containing abundant insect pests was present on the strandline and interesting flora was absent.

For "human use" factors only Lydstep Haven (40%), received a lower score than Trecco Bay's 43% (Table 6.12). Traffic fumes and odours from food preparation were detectable when the beach was visited. Noise from traffic and the "Coney Beach" fairground complex were detectable. Although lifeguards were present, beach control appeared weak with absent or ineffective management of litter, dog access and watersports. Although toilets were available in the locality, they were quite dirty and in any case too distant to be considered as being

conveniently available for use by beach users. Overall, the picture at Trecco Bay was reminiscent of that painted by Owen (1990), when he lamented the low standard of many British seaside resorts.

Langland achieved the highest score (64%), for beaches classified as being of "small resort" character Table 6.14). This was in spite of the fact that Langland was only rated equal 47th (with 48%), for scenery/landscape, with a resulting modest score (48%), for "physical" factors (Table 6.12). "Biological" factors rated 66% due to a 100% pass of "I" bathing water standards (EC Bathing Waters Directive, 76/160/EEC; Table 2.1). Langland scored 77% for "human use" factors with absent or negligible fumes from industry and traffic, although some traffic noise was detected. Car parking was available within 200 m with good beach access. Basic refreshment facilities and only "slightly dirty" toilets (Appendix 13), were present. Lifeguards were present and dogs and vehicles were banned from the beach. A considerable amount of litter was however present on the beach at the time of the checklist visit.

The South Beach at Tenby had the highest score (66%; Table 6.15), for a medium/large resort beach. The beach scored only 52% for scenery/landscape, which contributed to a modest score of 50% for "physical" factors (Table 6.12). An attractive feature of the beach was the exceptionally clear water, with the bottom visible below 2 - 3 m depth of water. "Biological" factors rated a high score of 84%, with seaweed, floating material and sewage debris being absent or negligible in quantity. The beach achieved a 100% pass of "I" standards as set by the EC Bathing Waters Directive (76/160/EEC; Table 2.1), for 1994. "Human use" factors were scored at 73%, with unpleasant odours of all kinds undetectable but some traffic noise. Toilets were only slightly dirty and very little litter was present on the beach. Management could be strengthened however, by enforcement of effective dog and watersport regulation. Overall, the South Beach at Tenby represented a pleasant larger resort beach with essential facilities in place and kept in good condition for the benefit of beach users.

Beach	Total %
Langland	64
Tenby - North	64
Port Eynon	63
Llangranog	62
Aberdyfi	60
Abersoch	60
Amroth	58
Broad Haven	57
Oxwich	57
Dinas Dinlli	57
Landudno - West	56
Tywyn	55
Pendine	55
Benllech	54
Borth	53
Southerndown	52
Cricceith	49
Lydstep Haven	48
Colwyn Bay	48
Ogmore	47
Prestatyn	47
Llantwit Major	45
Aberaeron	44

Table 6.14 Percentage Rating Scores - Beaches at Small Resorts

Overall beach rating scores were also divided according to geographical location of the beaches (Fig. 6.46, Table 6.16). The area with a substantial number of rated beaches producing the highest mean score was Pembrokeshire (17 beaches; 61%). Carmarthen Bay with 2 featured beaches averaged 62%. South-east Wales beaches had the lowest mean scores (14 beaches; 49%). It should be borne in mind that in the southern half of Wales, many beaches other than the EC designated beaches were surveyed for rating purposes. Many of these were beaches meriting the Seaside Award or featured in the Good Beach Guide

(MCS, 1994), so the sample of beaches which were rated was not uniformly representative of the population of beaches in Wales.

Beach	Total %
Tenby - South	66
Saundersfoot	62
Whitmore Bay (Barry)	61
Barmouth	60
Swansea Bay	60
Rhyl	58
New Quay	58
Llandudno - North East	54
Mumbles	53
Jackson's Bay (Barry)	53
Aberystwyth - South	52
Aberystwyth - North	50
Sandy Bay (Porthcawl)	45
Aberafan	45
Trecco Bay (Porthcawl)	39

Table 6.15 Percentage Rating Scores - Beaches at Medium/Large Resorts

Area	No. of Beaches Rated	Mean Score (%)	Range (%)
N. Wales Coast	6	53.2	47-58
Anglesey	4	57.5	54-61
Llyn & N. Cardigan Bay	11	56.5	49-60
Ceredigion	8	55.9	44-67
Pembrokeshire	17	60.9	48-69
Carmarthen Bay	2	62.0	55-69
Gower	8	59.6	53-66
S.E. Wales	14	49.1	40-61

Table 6.16 Mean Rating Scores According to Location

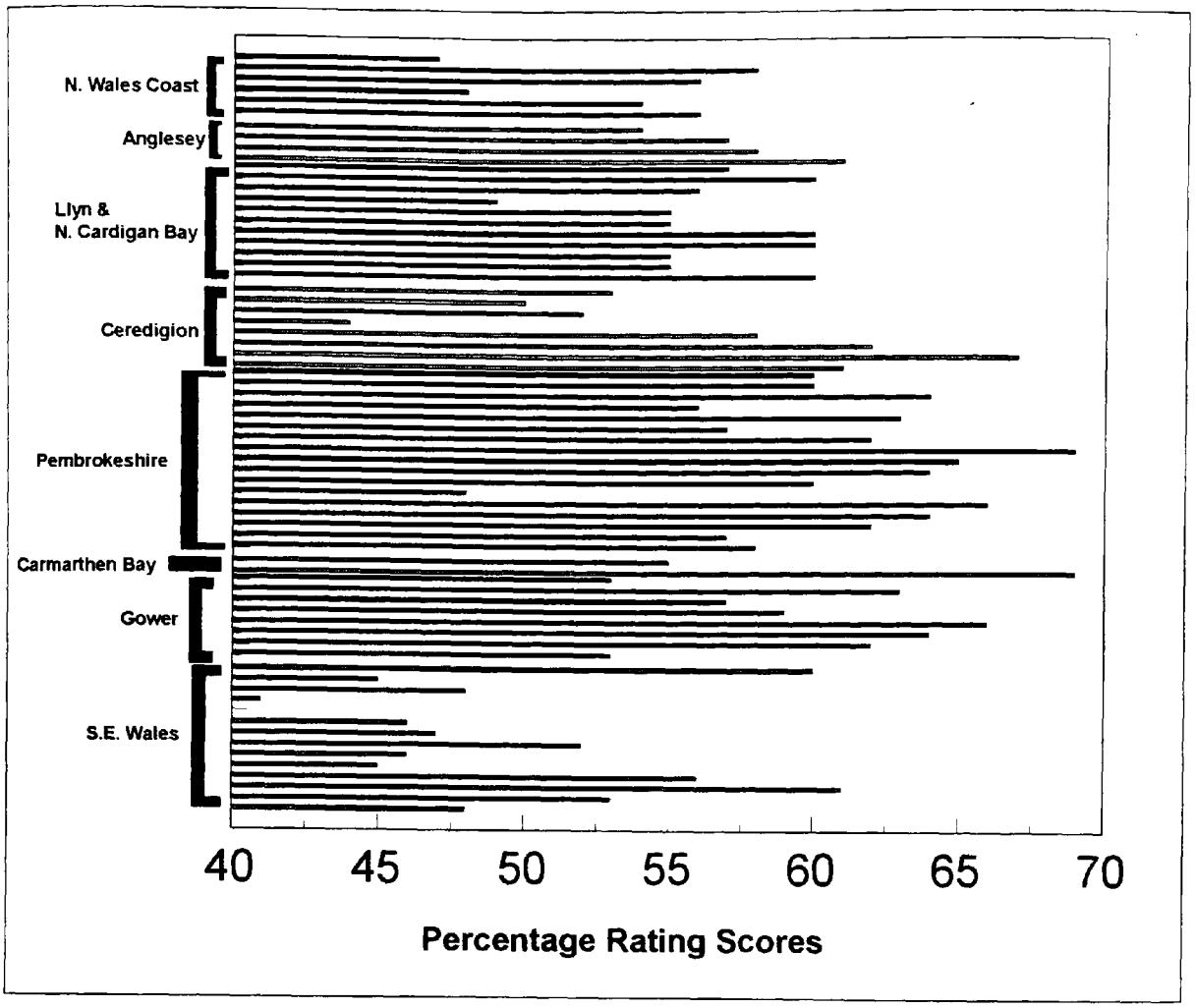


Fig. 6.46 Rating Scores According to Geographical Location

The percentage rating scores obtained in relation to beach awards/recommendations commonly given in the UK (European Blue Flag, Seaside Award - ordinary and Premier - and recommendation in the Good Beach Guide; MCS, 1994), for the beaches in 1994, are shown in Table 6.17. There were statistically significant positive correlations ($p < 0.01$) between all the awards/recommendations and the rating scores obtained in this study. In 1994 only two Welsh beaches, Pembray and Whitesands Bay, were awarded a Blue Flag. These two beaches scored 69% (equal highest score) and 64% (equal 7th), respectively in this study. The European Blue Flag Award takes account of 15 beach factors featured in this study, accounting for 28.7% of the total beach rating for "small resort" beaches (as defined in this study), and 31.4% for medium/large resort beaches.

Beach	Total %	Blue Flag	Seaside Award	Premier Seaside Award	Good Beach Guide	EC Beach (√)
Broadhaven (S. Pembs.)	69		Y	Y		
Pembray (Cefn Sidan)	69	Y	Y	Y	Y	√
Mwnt	67		Y	Y	Y	
Caswell Bay	66					√
Tenby - South	66		Y			
Barafundle Bay	65		Y	Y	Y	
Freshwater East	64		Y	Y		
Langland Bay	64					√
Whitesands Bay	64	Y	Y	Y	Y	√
Tenby - North	64		Y			√
Newgale Sands	63		Y	Y	Y	√
Port Eynon	63				Y	√
Bracelet Bay	62					√
Marloes Sands	62		Y	Y	Y	
Llangranog	62		Y			
Saundersfoot	62		Y			√
Poppit Sands	61		Y	Y		
Whitmore Bay (Barry)	61					√
Rhosneigr - Traeth Llydan	61					√
Abereiddy Bay	60		Y	Y		
Newport Sands	60					√
Aberdyfi	60					√
Barmouth	60					√
Llandanwg	60		Y			√
Swansea Bay	60					√
Abersoch	60					√
Manorbier	60		Y	Y	Y	
Three Cliffs Bay	59					
Rhyl	58					√
New Quay	58		Y			√
Rhosneigr - Traeth Crigyll	58		Y	Y		
Amroth	58		Y			√
Trearddur Bay	57		Y			√
Broad Haven	57		Y			√
Oxwich	57		Y	Y	Y	√
Wiseman's Bridge	57		Y			
Dinas Dinlli	57		Y	Y		√
Cold Knap (Barry)	56					√

Beach	Total %	Blue Flag	Seaside Award	Premier Seaside Award	Good Beach Guide	EC Beach (√)
Llandudno - West	56					√
Kinmel Bay	56					√
Caerfai Bay	56		Y		Y	
Pwllheli	56					√
Tywyn	55					√
Harlech	55					√
Fairbourne	55					√
Pendine	55					√
Morfa Bychan	55					√
Llandudno - North	54					√
Benllech	54		Y			√
Mumbles	53					
Jackson's Bay (Barry)	53					√
Rhossili	53				Y	√
Borth	53		Y			√
Aberystwyth - South	52					√
Southerndown	52		Y			√
Aberystwyth - North	50					√
Criccieth	49					√
Lydstep Haven	48		Y	Y	Y	
Colwyn Bay	48					√
St. Mary's Well Bay	48					
Rest Bay (Porthcawl)	48					√
Ogmore by Sea	47					
Prestatyn	47					√
Newton Bay (Porthcawl)	46					
Nash	46					
Sandy Bay (Porthcawl)	45					√
Llantwit Major	45					
Aberafan	45					√
Aberaeron	44		Y			√
Trecco Bay (Porthcawl)	39					√

Table 6.17 Percentage Rating Scores Compared to Other Beach Awards and Recommendations (in 1994)

Twelve beaches of the 70 rated in this study were recommended by the Good Beach Guide in 1994 (MCS, 1994). Seven of the recommended beaches

were in the top 16 beaches in terms of percentage ratings in this study (Table 6.17). As stated in Chapter 2.5.4, the prime criterion for a beach to be recommended in the Good Beach Guide (MCS, 1994, 1995), was microbiological water quality, with a minimum standard of 100% pass of EC Mandatory standards and 80% pass of Guideline Coliform standards (Tables 2.1 & 2.3). In this study, microbiological water quality accounted for only 2.99% (at small and medium/large resort beaches), to 3.42% (at beaches with no tourist facilities), of the total beach rating score. Hence variation in microbiological water quality on its own, would have very little effect on total beach rating scores. One must therefore look elsewhere to fully explain the apparent correlation between the beach rating scores obtained in this study and recommendation in the Good Beach Guide (MCS, 1994).

There are other reasons for possible non-recommendation of beaches achieving the required bathing water quality standard (see Chapter 2.5.4), but in 1994 these only applied to 3 Welsh beaches (MCS, 1994). These were Rhosneigr - Traeth Crigyll, on account of a raw sewage discharge at the beach; Dinas Dinlli due to reports of medical waste; and Pendine due to the fact that part of the beach was often closed due to use of the nearby Ministry of Defence firing range. At Rhosneigr - Traeth Crigyll at the time of checklist completion, the amount of sewage debris observed was in the lowest checklist category and the amount of other beach litter was in the lowest category but one out of four categories (Appendix 13). Therefore the score for Rhosneigr - Traeth Crigyll (58%; Table 6.10), was not significantly depressed by these beach aspects which could have been compromised by the sewage discharge. Indeed, microbiological water quality at the beach was in the highest (best) of five categories.

With regard to Dinas Dinlli, the picture was similar with no obvious medical waste observed and sewage debris abundance again in the lowest category. Although more litter was present than at Rhosneigr - Traeth Crigyll (second worst of the four checklist categories; Appendix 13), microbiological water quality was in the highest (best quality) category. It was difficult to see how the presence of the Ministry of Defence firing range at Pendine would have affected the scoring system

used in this study, except conceivably via the scenery/landscape score (59%; Table 6.9). This scenery/landscape score for Pendine ranked 22nd of the 70 beaches assessed, so any negative effect of the visibility of the Ministry of Defence installation could only be small. In conclusion, it is not obvious why beaches recommended in the 1994 Good Beach Guide (MCS, 1994), which is based almost entirely on water quality, seemed to score highly in this rating system. Indeed, it may be noted that the 1996 Good Beach Guide recommended Trecco Bay at Porthcawl, which in 1994 was easily the lowest scoring (39%; Table 6.10), of the 70 beaches assessed in this study.

Thirty of the 70 beaches assessed in this study received the Seaside Award in 1994, with 12 meriting (on the basis of water quality; see Chapter 2.5.3), the now-discontinued Premier Award (Table 6.17). The top three beaches in this rating system, eight of the top ten and 24 out of the top 37 received a Seaside Award in 1994 (Table 6.17). This compared with only five of the bottom 29 beaches rated in this study receiving the award. In the case of the Seaside Award, the apparent correlation between award status and rating score appears to be easier to explain, as the Seaside Award was mainly based on the availability and good quality of beach facilities, beach regulation/management, beach cleanliness (in terms of litter, sewage, excessive seaweed and other debris), as well as water quality. The number of separate factors included in the Seaside Award was 29 for "resort" beaches and 12 for "rural" beaches, not all of which featured in this rating scheme. However an estimate can be made of the percentage of the total beach rating scores in this study, which the factors taken account of in the Seaside Award made up. For the Seaside Awards' "resort" beaches, the 14 relevant factors made up 30.7% of the total beach rating score for small resort beaches (as defined for this study), and 31.5% for medium/large resort beaches. For "rural" beaches the 9 relevant factors made up 26.2% (for beaches defined in this study as having no tourist facilities), and 26.9% for beaches with only basic visitor facilities. Given that the difference between the highest and lowest rating scores in this study was 30%, satisfaction of the criteria required for the Seaside Award could make a substantial difference to the relative rankings of the 70 beaches.

6.5 Relationship of Beach User Priorities to Other Parameters

All the relationships described below were confirmed ($p < 0.05$), by multiple regression analysis of the data (Tables 6.6 and 6.7).

6.5.1 Relationship of Priorities to Age

Younger beach users stated higher priorities for absence of factory noise and odours, traffic/vehicle fumes, and absence of oil and sewage contamination of the beach. Older visitors gave higher priority to absence of strong winds and insect pests together with absence of dangerous waves and currents. Total priority level for beach safety factors was shown to be positively correlated with age. This suggests that older beach users are more concerned with the possible dangers of sea bathing, implying a greater acceptance of risk-taking behaviour in young beach users. Williams & Williams (1988), examined rockfall hazard perception at the Glamorgan Heritage Coast and failed to identify any particular "risk-taking" group of beach users in terms of socio-demographics or personality parameters. These negative findings (Williams & Williams, 1988), accord with much previous research into risk-taking behaviour (Mileti *et al.*, 1975).

In Part 4 of the questionnaire, younger visitors gave higher ranking to "Sand and Water Quality" while older visitors gave higher ranking to "Access and Parking". This suggests a greater priority is given to environmental quality by young beach users. This supports the findings of Banerjee (1977), who reported that those under 25 years of age were most critical of man-made alterations to the coastal environment. Young people have a distinct, high spending profile as visitors/tourists (Wales Tourist Board, 1994), and are obviously of long term importance in terms of repeat visits. This emphasises the importance of maintaining the environmental quality of Welsh beaches for the future economic prosperity of coastal tourism. The higher priority for beach access by older visitors suggests a (perhaps understandable) reluctance to walk long distances or over difficult terrain to reach the beach.

6.5.2 Relationship of Priorities to Gender

Females were shown to give higher priority to presence of rock pools at the beach and absence of dangerous waves. Total priority level for beach safety factors was also higher for females. As mentioned above (Chapter 6.5.1), most previous research has failed to demonstrate a difference in risk-taking behaviour between males and females (Mileti *et al.*, 1975), which may be considered analogous with priority given to beach safety. Males were shown to give higher priority to absence of traffic fumes. In terms of findings at the GHC (Chapter 4.7.1), suggesting that females might show greater concern about pollution in general and unpleasant odours in particular, this finding was unexpected. No other relationships between gender and pollution parameters were observed.

6.5.3 Relationship of Priorities to Social Class

Those of higher social class gave higher priority to absence of water pollution and clarity of bathing water. Cleanliness of toilets was also a higher priority for those of higher social class. This supported findings at the GHC (Chapter 4.7.1), suggesting that users of higher social class would be likely to give higher priority to cleanliness in general. Also, David (1971), suggested that prior expectations about what a person would view as an acceptable level of pollution could influence pollution perception. Hence a person familiarised with low environmental quality in their home area environment might perceive a particular level of pollution as acceptable, whereas the same beach pollution level might be considered unacceptable to a person accustomed to good environmental standards. Such aspects of pollution perception are of considerable importance in planning pollution control and environmental improvement programmes, since the perception of pollution levels by the visitor (whatever the measured pollution levels actually are), is likely to influence decisions regarding future visits and hence the economic future of the beach/resort.

Presence of showers was the only beach factor (from Part 3 of the questionnaire), shown by multiple regression analysis to be given higher priority by those of lower social class. In Part 4 of the questionnaire, higher ranking was given to "Access and Parking" by those of lower social class. This suggested that beach users from higher social classes were concerned that improved access might despoil pristine, natural and quiet environments in terms of increases in both traffic noise and visitor numbers.

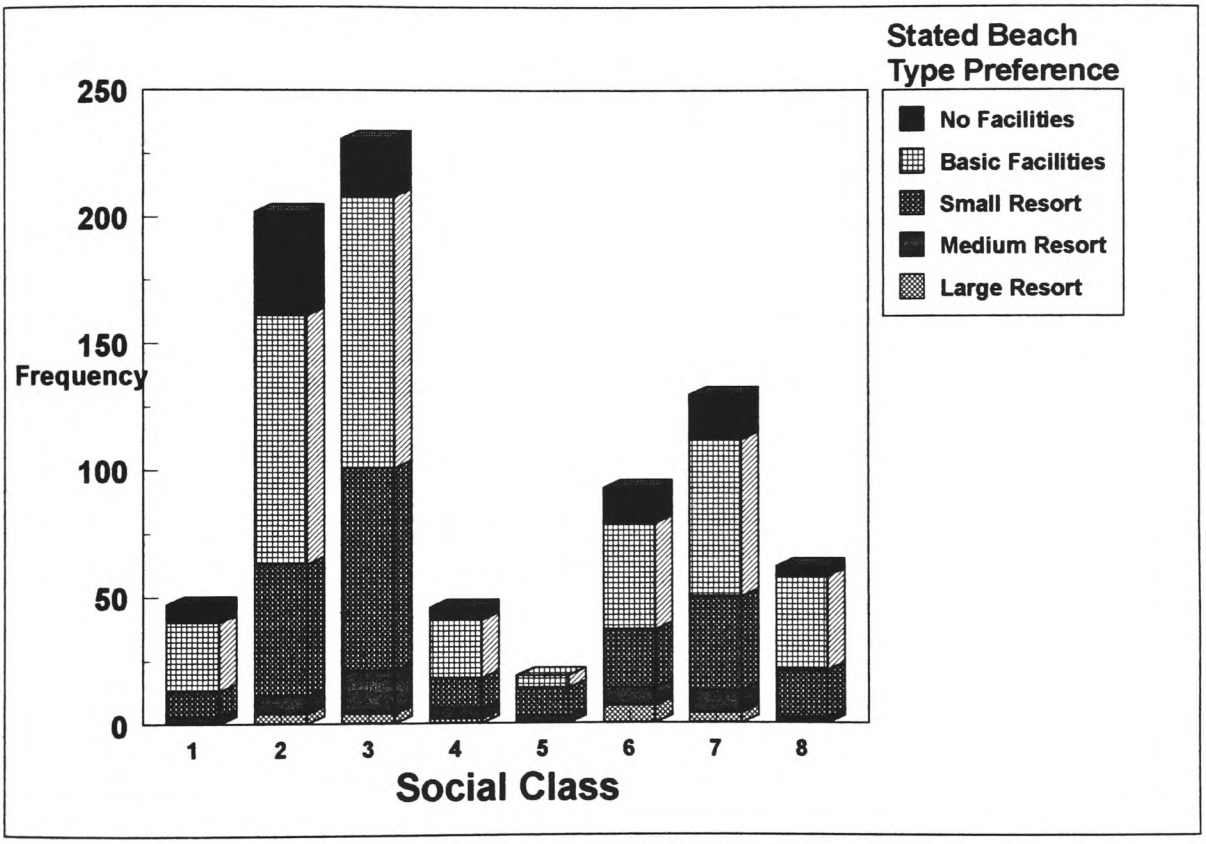
Connections between beach user social class and preferences/priorities for the beach environment have considerable implications for coastal tourism economics. Visitors of higher social class tend to have high disposable incomes, so further investigations of their perceptions with regard to the beach environment should be seen as essential to safeguard the economic prosperity of beach resorts.

6.5.4 Other Relationships Identified by Multiple Regression Analysis

Beach users originating from within Wales gave higher priority to water clarity and absence of road noise than those originating outside Wales. English visitors to the beaches gave higher priority to the presence of shower facilities. No other significant differences ($p < 0.05$), were observed between beach users living in Wales and those originating from outside Wales. Those who had travelled a greater distance to visit the beach gave higher ranking to "Facilities" in Part 4 of the questionnaire, but placed a lower priority on scenery/landscape quality.

Those stating a preference for visiting more commercialised beaches tended to plan a longer stay at the beach, as did those of lower social class. Planned length of stay is clearly of importance in planning provision of facilities for beach users. For management purposes it could also be valuable to know the type of beach users (in socio-demographic terms), who are likely to stay at the beach for the longest time and which particular facilities (and of which type), they require. Beach users of higher social class also preferred to visit less commercialised beaches ($p < 0.001$). A breakdown of beach user social class in relation to stated

preferred beach type is shown in Fig. 6.47. The same data for employed beach users only, is shown in terms of percentages in Fig. 6.48. The statistically identified trend supported the findings at the GHC (Chapter 4.7.3), and the view of Anatharaman (1980), that visitors from higher social classes would seek out more pristine leisure environments. However from examination of Fig. 6.48, it can be seen that while the overall trend across social classes 1 to 4 was still significant overall ($p < 0.01$), it did not approach a clear demarcation of preferred beach type between social classes. These aspects of beach type preference provide scope for much further work in guiding beach management policies.



Key to Fig. 6.47			
Description	Social Class	Description	Social Class
Professional Occupations	1	Unskilled Occupations	5
Intermediate Occupations	2	Students	6
Skilled Occupations	3	Unemployed, housewives	7
Partly Skilled Occupations	4	Retired	8

Fig. 6.47 Beach User Social Class in Relation to Preferred Beach Type (based on OPCS, 1991)

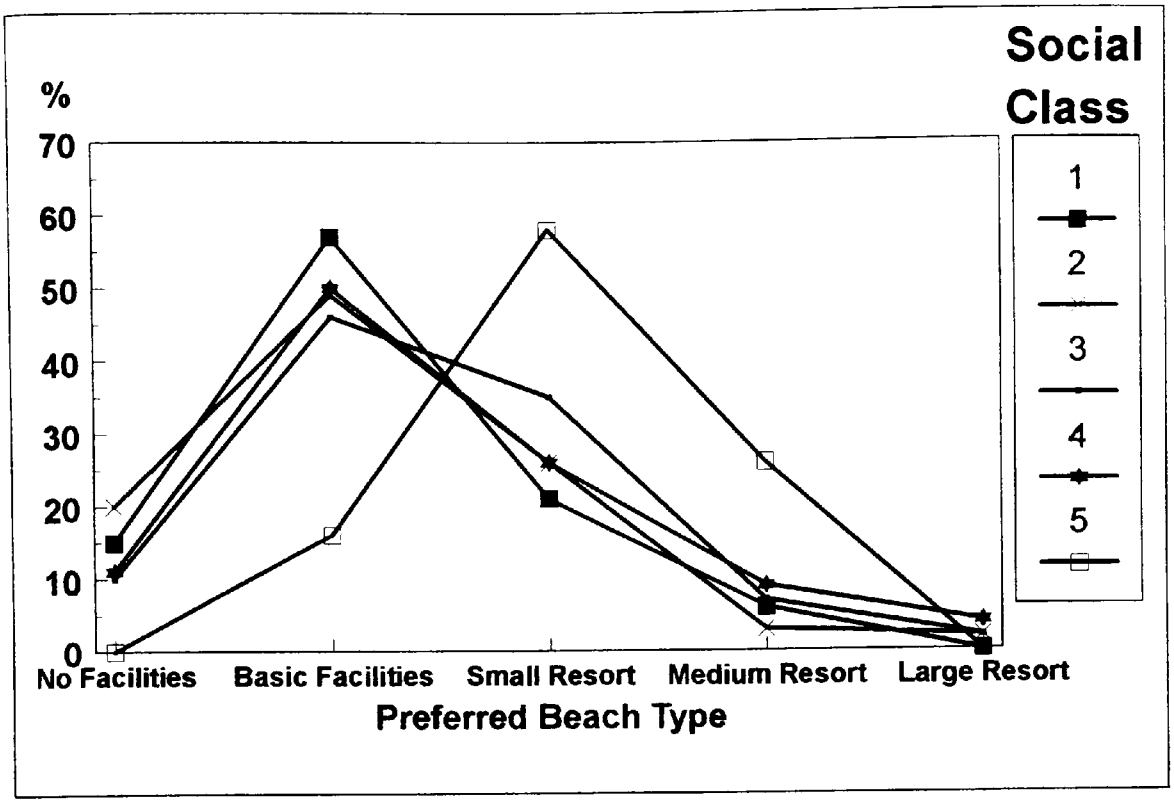


Fig. 6.48 Beach User Social Class (Classes 1 - 5): Percentages in Relation to Preferred Beach Type (based on OPCS, 1991)

CHAPTER 7

PILOT STUDIES IN THE MEDITERRANEAN

7.1 Introduction

As an adjunct to the main study in Wales, pilot-scale studies of beach user perceptions were carried out at selected beaches on the Costa Dorada, Catalonia, Spain (Segur Calafell, Sant Salvador, Coma Ruga, El Francas; Fig. 7.1), and the Turkish Aegean Coast (Fethiye-Belcegiz, Fethiye-Calis, Dalyan, Marmaris Municipality Beach and Turgutreis; Fig. 7.2). In Turkey, an additional aim was to calculate percentage rating scores for 5 popular tourist beaches (Fethiye-Belcegiz, Fethiye-Calis, Fethiye-Oludeniz, Dalyan and Marmaris Municipality Beach; Fig. 7.2). The study in Spain was carried in co-operation with Universitat Politecnica de Catalunya, Barcelona and the Turkish study in co-operation with the Middle East Technical University, Ankara and Network MedCoast.

Little literature exists on beach user perception in the context of beach management in the areas studied. Breton (1993) undertook a perception study of Costa Dorada beach users, residents and local tourist business employees for the local government of the Metropolitan Area of Barcelona. The study covered a selection of tourist beaches and generated some specific management recommendations. No work can be referenced with regard to beach user preferences and priorities on the Turkish Aegean Coast (Morgan *et al.*, 1995). With respect to beach awards/ratings, Turkey joined the European Blue Flag award scheme on a pilot basis in 1993 and had achieved 15 Blue Flag beaches by 1996.

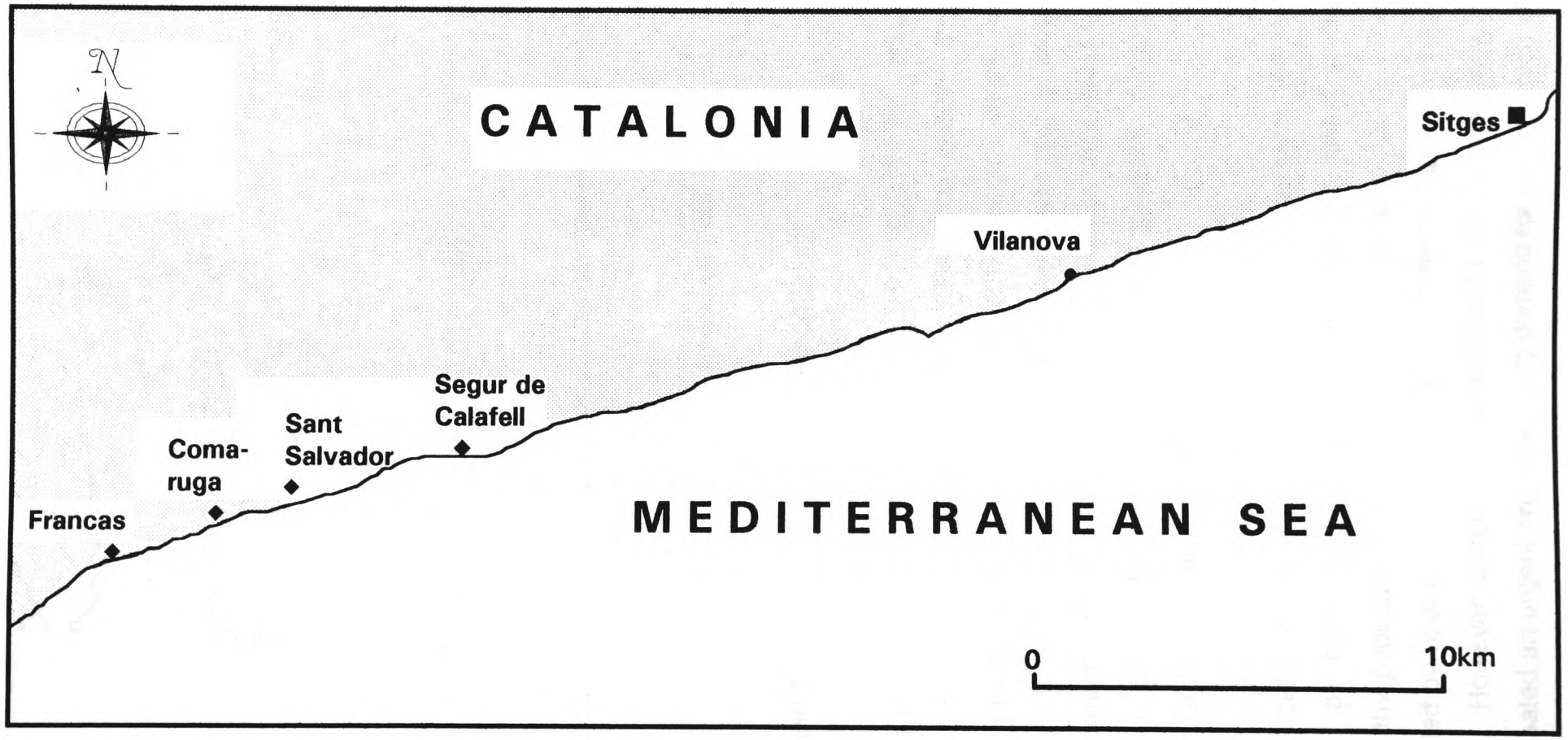


Fig. 7.1 Location of Study Beaches (marked ◆) in Catalonia, Spain

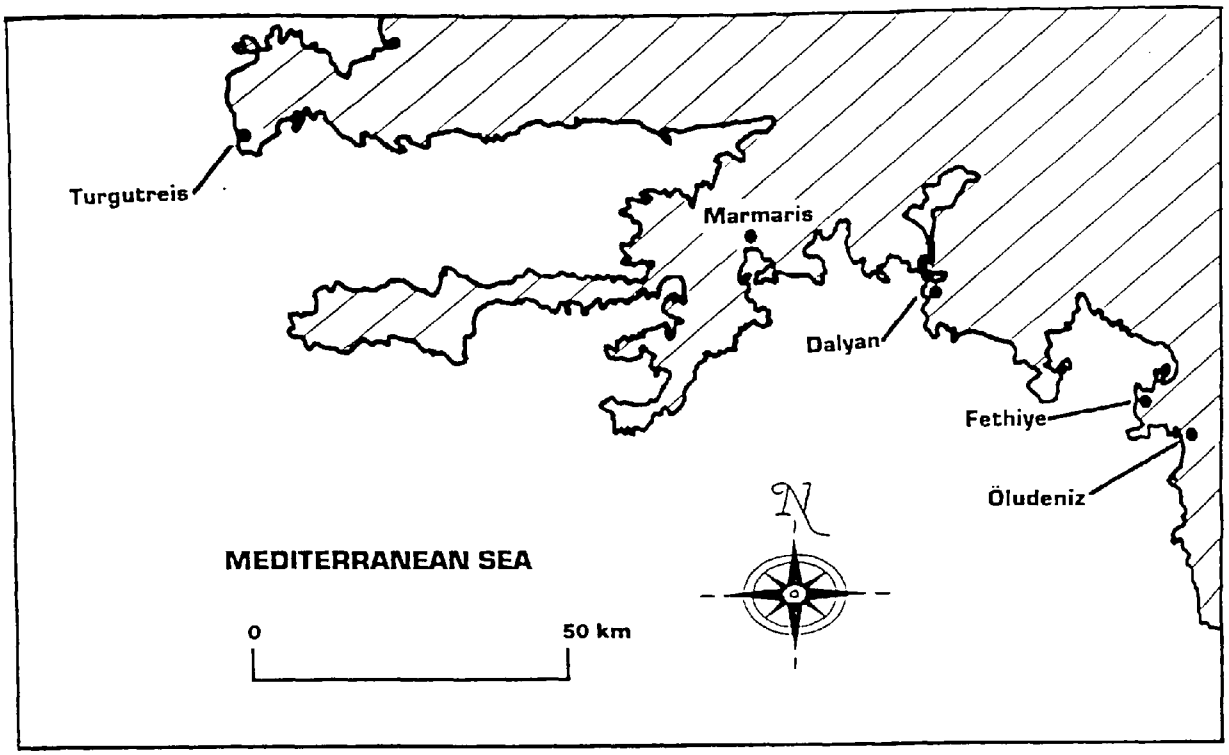


Fig. 7.2 - Turkish Aegean Coast

7.2 CZM and Tourism on the Mediterranean Coast

The 18 countries (including the former Yugoslavia) bordering the Mediterranean Sea have a population of around 350 million people. One hundred and thirty five million of these live in the coastal zone (Saliba, 1990a). Additionally, approximately 100 million tourists visit the Mediterranean region annually, most being from northern Europe (Gerlach, 1991). The strain on the coastal environment is further accentuated by the fact that the overwhelming majority of visits take place during May to October (Saliba, 1990b).

Large scale Mediterranean tourism dates from the early 1960's, by which time cheaper air travel had brought the Mediterranean closer to the densely packed, wealthy populations of northern Europe (Gerlach, 1991). Tourists were actively courted by Spain and other southern European countries to help economic development. However, accelerated development of tourism in many countries of the region created an urgent and ever-rising demand for space, which was fulfilled

at a much faster pace than the development and implementation of comprehensive land use and environmental protection policies could equal (Saliba, 1990b). As a result, tourist development in many Mediterranean areas has had a range of adverse impacts. These have included marine pollution as a result of tourist-led industrial development and population growth, over-fishing, social and cultural impacts (Saliba, 1990a). It has also resulted in the development of major resorts constructed in a fashion conflicting with the natural features of the area; this has been termed "architectural pollution" (Gerlach, 1991).

During the early 1970's there were calls for action from many quarters to improve protection of the Mediterranean environment. Work by several United Nations agencies, the Commission of the European Communities and other bodies resulted in the initiation of the Mediterranean Action Plan (MAP), a multi-agency enterprise co-ordinated by the United Nations Environment Programme (UNEP). This was adopted by almost all Mediterranean states in 1975. MAP has resulted in the production of several protocols including those covering the dumping of wastes at sea, co-operation in pollution emergencies and land-based pollution, as well as programmes covering many aspects of pollution monitoring and research. Since its inception in 1990, the Environment Program for the Mediterranean (EPM), financed by the European Investment Bank, the World Bank, the United Nations Development Program and the European Union, has supported the preparation of CZM studies and plans (Hatziolos & Trumbic, 1996).

The European Coastal Charter in 1978 formulated 10 points, one of which was to develop greater awareness of the coastal zone which will influence the behaviour and attitude of users. Very little research has so far been done on this matter (Williams *et al.*, 1993). Whether planning policies are "bottom up", e.g. as in the UK, or "top down", e.g. the USA and Netherlands, lack of co-ordination at all levels is a significant problem (Williams *et al.*, 1993). The French national "Law on Planning, Protection and Development of the Coastal Space, 3.1.86", established base measures for management, which amongst other items defined environments on their aesthetic characteristics.

In the Spanish context, coastal planning geared almost purely to tourism seems to have been an almost unmitigated disaster (Williams *et al.*, 1993b), with "concretisation" along the Mediterranean coastline being the norm. In Turkey, the Coast Law (number 3621) was passed on 4th April 1990, to be followed by several others defining the use and planning of the Coastal Zone. It defined coastal space, established procedures for protection and set out limits for any changes inherent within the zone. A multitude of agencies are again involved, i.e. the Ministries of Tourism, Agriculture, Forestry and Rural Affairs, Culture, Public Works and Settlement, the Central Environmental Board and the State Planning Organisation, all of which contribute to the greater scene. At the local level however, little information percolates through the system regarding the desires of beach users. Decisions are made by "experts" who are assumed to know what the public wants. As mentioned in Chapter 1.2.4, authoritative commentators such as Fabbri (1996) and Orbach (1996), have regarded information flow between end users and decision makers as essential in achieving a policy consensus.

7.3 Locations

7.3.1 Costa Dorada

Segur de Calafell, Coma-ruga, El Francás and Sant Salvador (Fig. 7.1), are four beaches situated on the Costa Dorada (Baix Penedés region) in the Province of Tarragona. Segur de Calafell, Coma-ruga and El Francás are within the municipal authority of El Vendrell and Sant Salvador is within the control of Calafell municipality. The growth of tourism in this area started in the 1950's and is now the largest source of income for the coastal municipalities. Hotels and apartments together with their accompanying restaurants and entertainment developments have resulted in urbanisation of much of the coastline. This has been intensified by second-home developments for wealthy visitors with associated developments of marinas and yacht clubs, e.g. Segur de Calafell and Coma-ruga. All four beaches studied tended to attract predominantly native Spanish beach users rather than the large numbers of visiting overseas tourists seen at larger resorts further north. The

area is now (1996), well served in terms of communications by road (N-340 from Barcelona), rail and air (Barcelona International Airport).

Sediment movement along the coast is currently impeded by the Cubelles nuclear power plant and marinas. The marinas have caused accumulation of sediment between themselves and the "natural" beach line, accompanied by beach regression along the adjacent coast. The effect is exacerbated by dredging of the marina entrance channels and removal to deep water of the dredged sediment, effectively removing it from the coastal sedimentary system. Yet another factor is the decrease in sediment brought down by rivers, partly as a result of dam construction and flood prevention works. The net effect of these diverse factors has been considerable beach erosion at many locations including El Francás and Coma-ruga with consequent effects on beach tourism and safety of coastal properties in the face of storms. Beach nourishment has recently taken place at most major beaches along this stretch of coast, including those included in this study. Current morphology of the four beaches is similar; long sand beaches with heavy urban development.

The beach at Segur de Calafell extends for 7 km and includes a marina with capacity of 223 moorings. Although the population is only 6 000 in winter, this rises to 95 000 at the peak of the summer season. Most tourism is based on local (Spanish) visitors, mainly staying in apartments. Coma-ruga is located on a sandy beach extending for some 17 km. Like Segur de Calafell, it has a marina (265 moorings), and mainly Spanish-based tourism. El Francás is the least commercially orientated of the Catalonian beaches examined, with no dedicated beach tourist facilities. However, the beach frontage is heavily urbanised with many second-homes. Sant Salvador is also mainly a "second-home" resort, but with higher quality development and low-key commercialism.

7.3.2 Turkish Aegean Coast

The Turkish beaches examined all lie along the southern coast of the Mugla Province, one of the prime areas of Turkey for coastal tourism. Along this segment

of the coast, the topography is rather rugged and the coastline is highly indented. The beaches are either pocket beaches or spits. All the beaches serve international tourism more than recreation of the local population.

The beaches of Belcegiz and Oludeniz occupy the Belcigiz Bay (Fig. 7.2). The part of the beach known as Oludeniz, is a spit located at the north-west end of the bay, separating a highly scenic, deep lagoon from the sea. The spit has been planted with trees and managed as a recreational area by the Ministry of Forestry for many years (Morgan *et al.*, 1995). During recent years, management of Oludeniz Beach and part of Belcigiz Beach has been in the hands of a private company. The remainder of Belcigiz Beach is a public beach. Belcigiz Beach, surrounded by narrow dunes and backed by steep hills, is considered one of the most aesthetically attractive beaches in Turkey. Both beaches are visited daily by tourists coming from as far away as Fethiye.

Fethiye-Calis beach is a long, narrow beach on the north-east shore of Fethiye Bay. The town of Fethiye itself is developed with moderately-sized hotel and pension accommodation. The beach is managed as a public beach by the Fethiye Municipality.

Dalyan beach is on a 4 km spit adjacent to a delta-wetland system. The beach and wetland system form the basis for a large specially protected area, declared in 1988 to safeguard nesting sites of the loggerhead sea turtle. Access, unusually, is by boat from the town of Dalyan itself. The number of boats and visiting times are controlled to avoid disturbance to ecosystem and turtle nesting sites in particular.

Marmaris Municipality beach is a public beach backed by the town of Marmaris and managed by the Municipality. The beach extends through the north western shores of the highly protected Marmaris Bay. The land area behind the beach is occupied by the town, its accommodation and other tourist establishments.

7.4 Methodology

A questionnaire similar to that used for the main study in Wales (Chapter 5) was used during August 1994 at four Costa Dorada, Spain beaches (Segur Calafell, Sant Salvador, Coma Ruga, El Francas; Fig. 7.1). The questionnaire was carefully translated into Spanish, with Imperial units (feet, miles, etc.) converted to SI units. One hundred and fifty seven beach users were surveyed using the questionnaire.

Five Turkish Aegean Coast beaches (Fethiye-Belcegiz, Fethiye-Calis, Dalyan, Marmaris Municipality Beach and Turgutreis), were surveyed in August 1994 using an English language version of the questionnaire. Two hundred and forty five English speaking beach users were surveyed. As for the main study in Wales, in each case a stratified sample of users at each of the beaches was obtained by approaching groups, couples and individuals of a variety of ages.

In Turkey, the checklist was used in conjunction with the beach user preference/priority information gathered, to calculate percentage rating scores for 5 popular tourist beaches (Fethiye-Belcegiz, Fethiye-Calis, Fethiye-Oludeniz, Dalyan and Marmaris Municipality Beach; Fig. 7.2). For the purpose of weighting the checklist in relation to beach user preferences and priorities for different beach types, the number of separate beach categories in this study was reduced to 3. This was due to the small numbers of beach users stating a preference for "beaches with no tourist facilities" (n = 16) and "beaches at large resorts" (n = 11). The 3 final categories were; "beaches with few or no tourist facilities" (n = 112), "beaches at small resorts" (n = 74), and "beaches at medium or large resorts" (n = 58).

Beach scenery/landscape quality was not assessed because of logistic/organisational difficulties and in terms of judging, it was felt that it would be wrong to transpose Northern European landscape values to Mediterranean locations. Opinions regarding cultural differences in landscape appreciation have

been discussed in Chapter 5.2. Bathing water safety was assessed from beach morphology and typical wave height and a score calculated using a table modified from that used by Short (1993), as for the main study in Wales (Chapter 5.6). Beach climate scores were also calculated as for the main study in Wales (Chapter 5.5), but using the Mieczkowski (1985) "trade wind system" was used for months with average daily maximum temperatures of 25 - 33°C (Table 5.10). For monthly average daily maximum temperatures exceeding 33°C, a scale similar to Mieczkowski's (1985) "hot climate system" was used (Table 5.11).

7.5 Results and Discussion

7.5.1 Visitor Origin - Turkish Aegean Coast

In the sample at the Turkish Aegean Coast beaches, only English-speaking beach users were surveyed. The sample would therefore be expected to be atypical of the beaches in terms of beach user country of origin. Fifty nine percent of those interviewed were from the UK, with a further 29.5% from northern Europe (Fig. 7.3). Only 8% of those completing the questionnaire had their home in Turkey.

7.5.2 Preferences for Beach Aspects/Features

In view of the pilot scale of the studies in Spain and Turkey, only those aspects showing substantial differences between the study locations and of possible interest for beach management are discussed below.

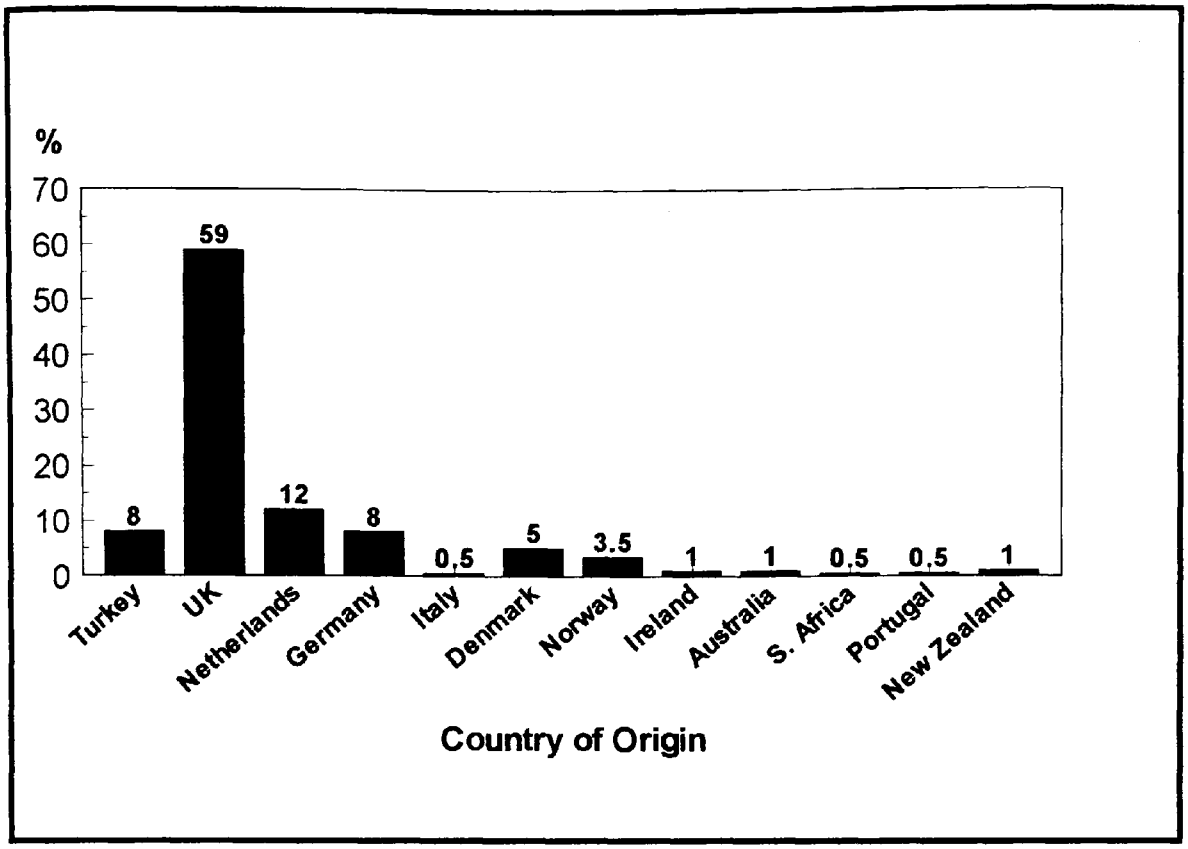


Fig. 7.3 Interviewee Country of Origin - Turkey

Temperature Sensation

With regard to perceived temperature sensation, it is interesting that the divergence was mainly between Spain and the two countries (Wales and Turkey), where users were mainly of non-Mediterranean origin. In Spain there was higher preferences for a "cooler" temperature sensation than in Wales and Turkey. Highest preference was given in Spain to a sensation of "not cold or warm", while in Wales and Turkey the sensation "warm" received the highest preference score (Fig. 7.4). On Welsh beaches in a typical summer, (such as the summer of 1994 during which the bulk of the questionnaire surveying in Wales took place), temperatures on the beach rarely rise above 25°C and there is often a moderate to strong cooling onshore breeze. It might therefore be expected that there would be a desire for higher temperatures than those actually experienced at the time.

The survey samples for the two Mediterranean countries were very different in terms of origin of the beach users surveyed. In Spain, the sample consisted of

Spanish-speaking, mainly local beach users compared to an English-speaking (mainly north European, with 59% from UK) sample at the Turkish beaches and an almost entirely UK-based sample (98%) for the Welsh beaches studied. Similarity of preference response seemed to be heavily influenced by subject origin.

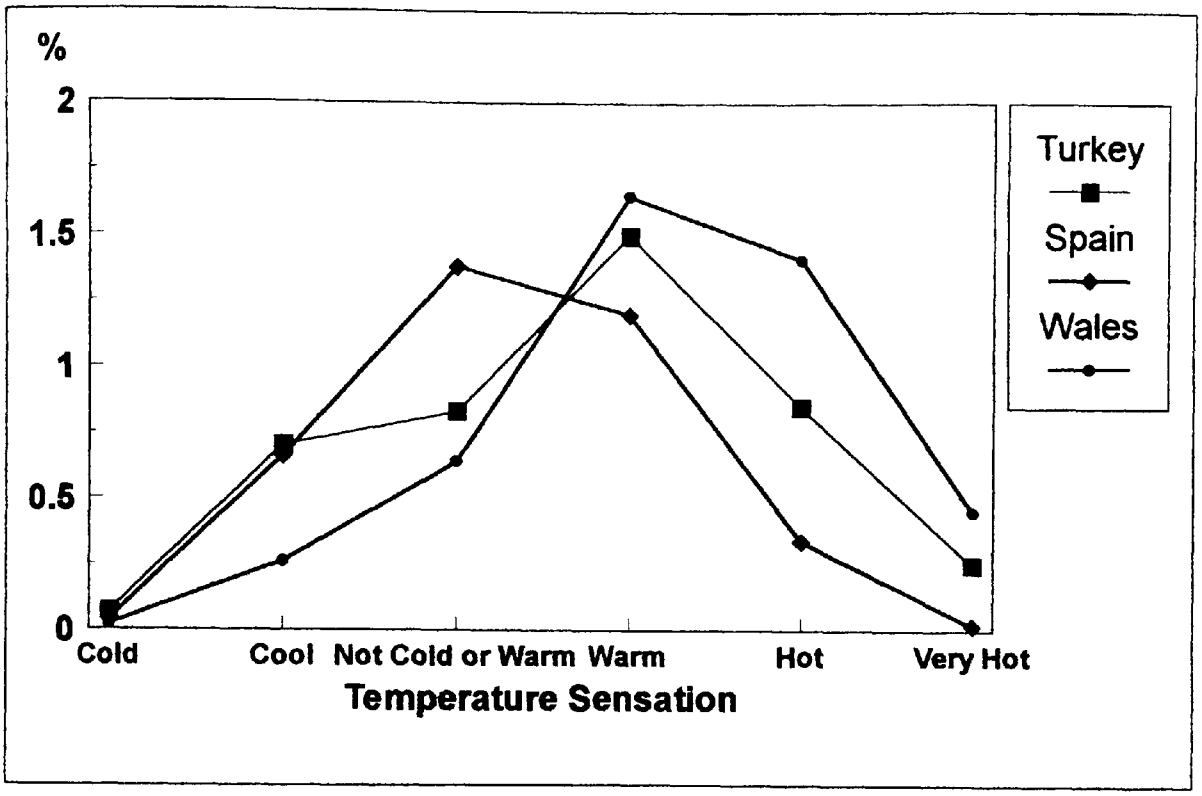


Fig. 7.4 Preference Scores for Temperature Sensation - Wales, Spain and Turkey

Bathing Water Temperature

For bathing water temperature, the Spanish sample showed highest preference for a temperature of 16 - 21°C compared to Wales and Turkey where the greatest preference was for a water temperature of 22 - 26°C (Fig. 7.5). The local Spanish beach users, perhaps being accustomed to several weeks of more or less continuously hot weather in summer, appear to prefer a cooler and more refreshing temperature for bathing water. In contrast, the preferences of north European respondents, might be a reflection of the prevailing summertime bathing water temperatures in their home countries (rarely higher than 18°C), inasmuch as

the stated preferred temperature may reflect a desire for a substantially higher temperature which would make sea bathing a more enjoyable experience.

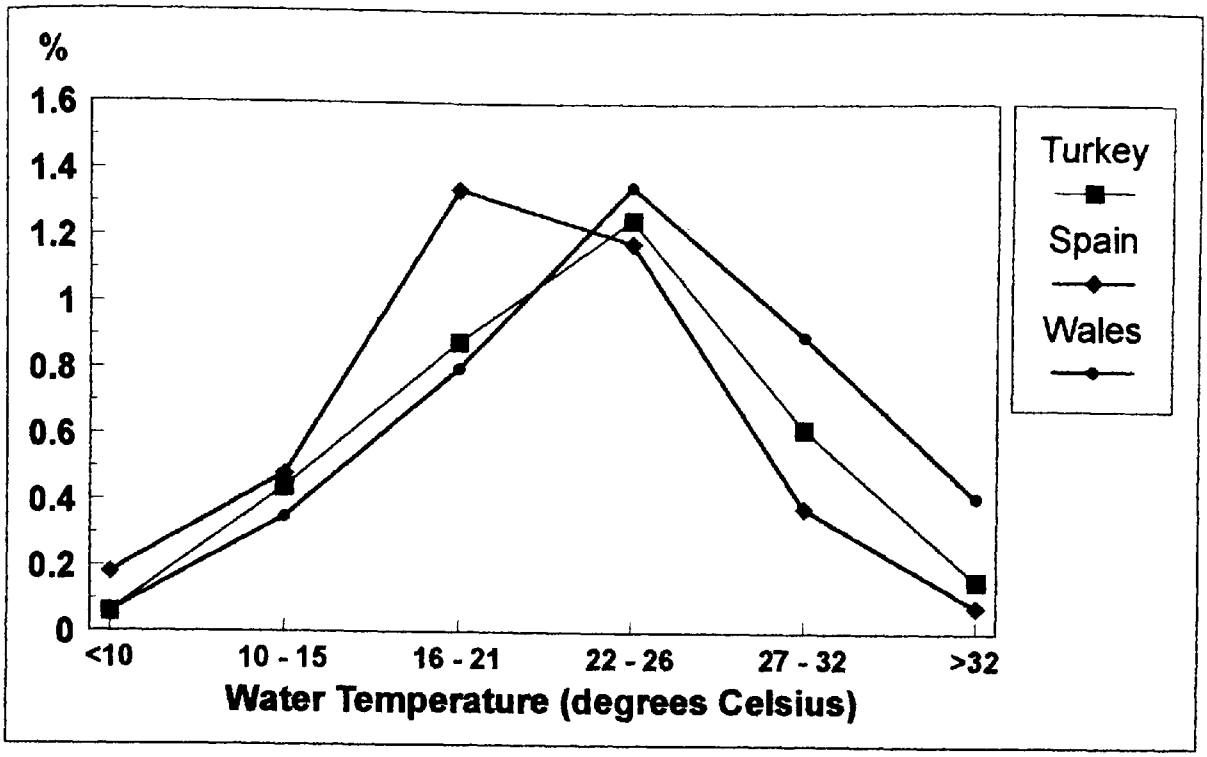


Fig. 7.5 Preference Scores for Bathing Water Temperature - Wales, Spain and Turkey

Beach Slope (below water line)

There was a preference in Spain and Turkey for steeper beach slopes below the water line compared to Wales (Fig. 7.6). The macrotidal regime of the Welsh coastline means that the slope below the high tide line of most sandy beaches in Wales is rarely steep and is often extremely shallow. In contrast, the microtidal nature of the Mediterranean results in often steep beach slopes below the water line at Spanish beaches. Again, one must consider the effect of immediate environment on attitudes with regard to stated preference for such factors.

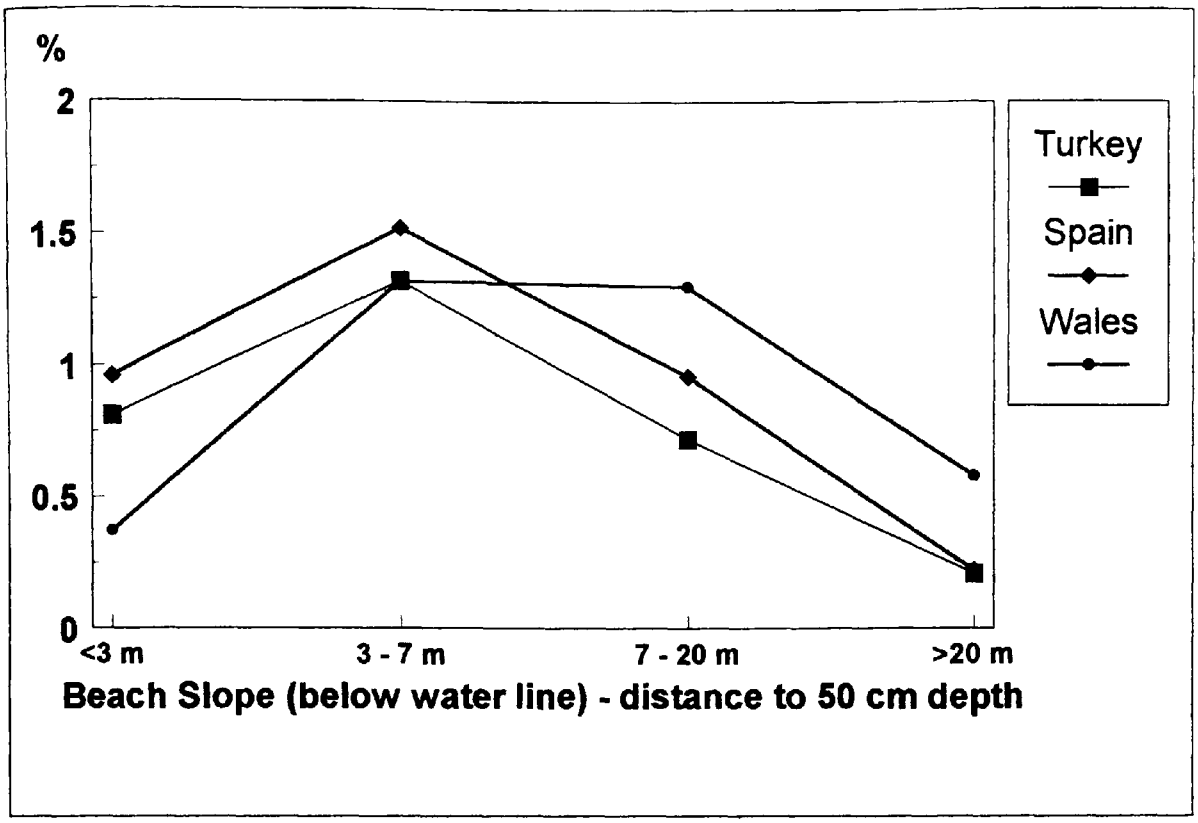


Fig. 7.6 Preference Scores for Beach Slope (below water line) - Wales, Spain and Turkey

Beach Slope (above water line)

With regard to beach slope above the water line, there was a notably greater stated preference in Spain for beaches which were "flat" (<5° slope) compared to the samples in Wales and Turkey (Fig. 7.7). The nourishment and regeneration of the Costa Dorada beaches has resulted in modification of the beach profile, often with a high terrace and a lip or step near the water's edge. The divergence of opinion observed may suggest a desire by Costa Dorada beach users to see a beach with a more "natural" slope profile.

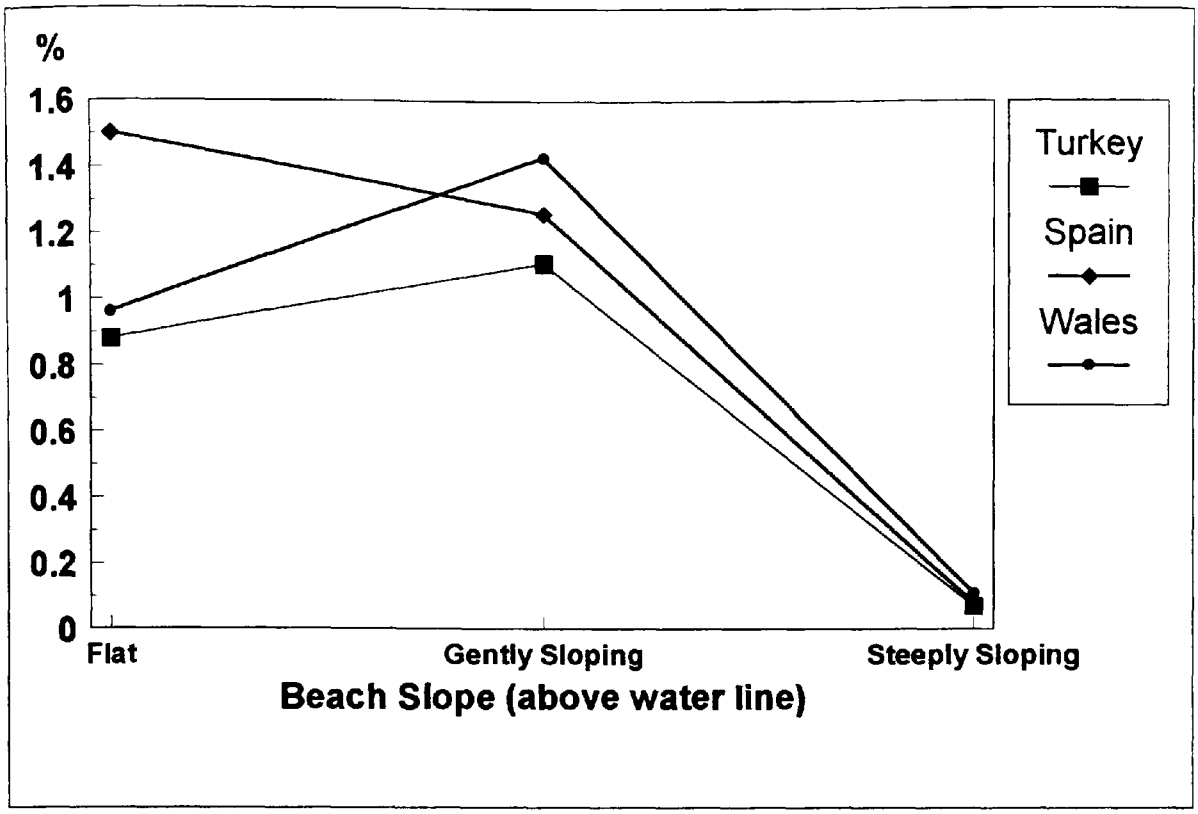


Fig. 7.7 Preference Scores for Beach Slope (above water line) - Wales, Spain and Turkey

Breaking Wave Size

There was a higher level of preference in the Spanish sample for small breaking wave sizes (less than 30 cm and especially less than 10 cm), compared to Wales and Turkey (Fig. 7.8). Again this could be attributable to anomalous breaking wave behaviour at the Spanish study beaches as a result of beach profile alteration from beach nourishment. If so, it would imply an influence of immediate environment on stated preference. It was interesting that the preferences for Wales and Turkey show little difference even though breaking wave sizes are often substantially larger along the Welsh coast than the Turkish Aegean coast.

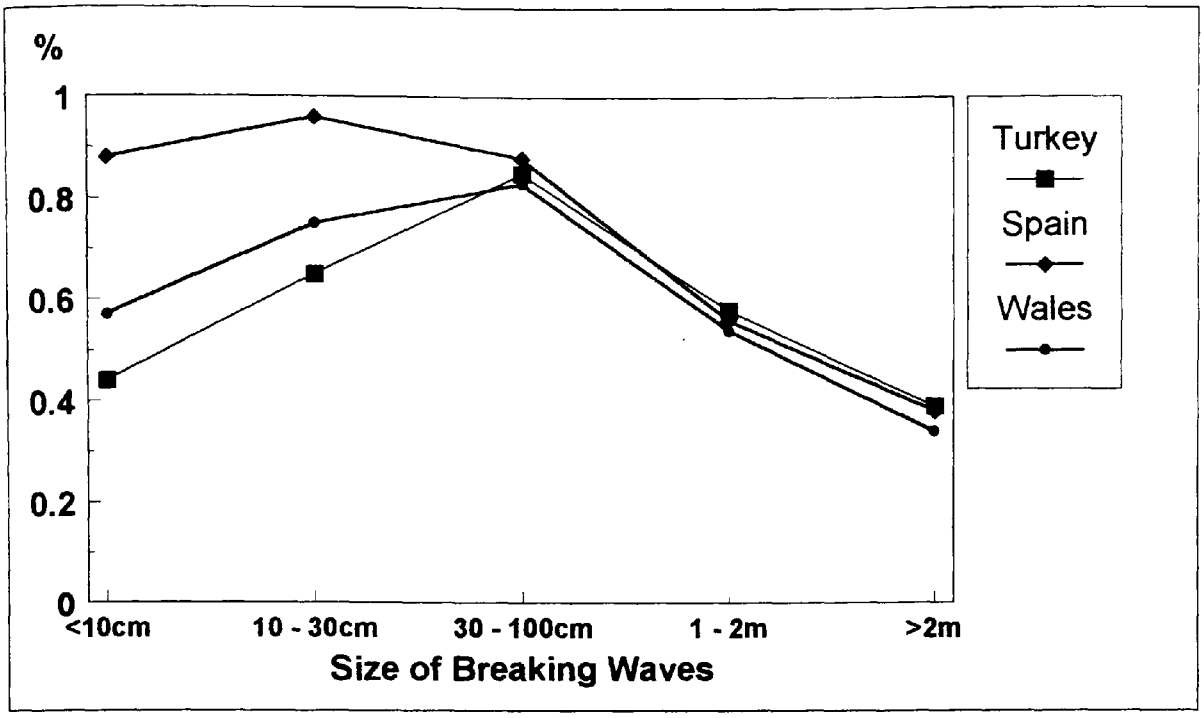


Fig. 7.8 Preference Scores for Breaking Wave Size - Wales, Spain and Turkey

Beach Material

For beach material, there was little difference between the stated preferences for beach material between Wales, Spain and Turkey. Sand was clearly the preferred beach material in each case, being the first choice of more than 90% of beach users in each country. There was a highest preference score for "light tan" coloured sand from beach users in Spain as there was in Wales (1.78% of total rating score), but in Turkey the most preferred sand colour was white (1.91%).

Location of Car Parking

In Wales the highest preference was for car parking within 200 m of the beach (Fig. 7.9). In Turkey, beach users wanted car parking kept away from the beach area - by far the *lowest* preference was for car parking within 200 m of the beach. At the Welsh beaches investigated, 47% of beach users surveyed had travelled from their own home or the home of a friend/relative on the day of their

visit and private car transport would be expected to predominate. A reluctance to park more than 1 km away from the beach might therefore be understandable.

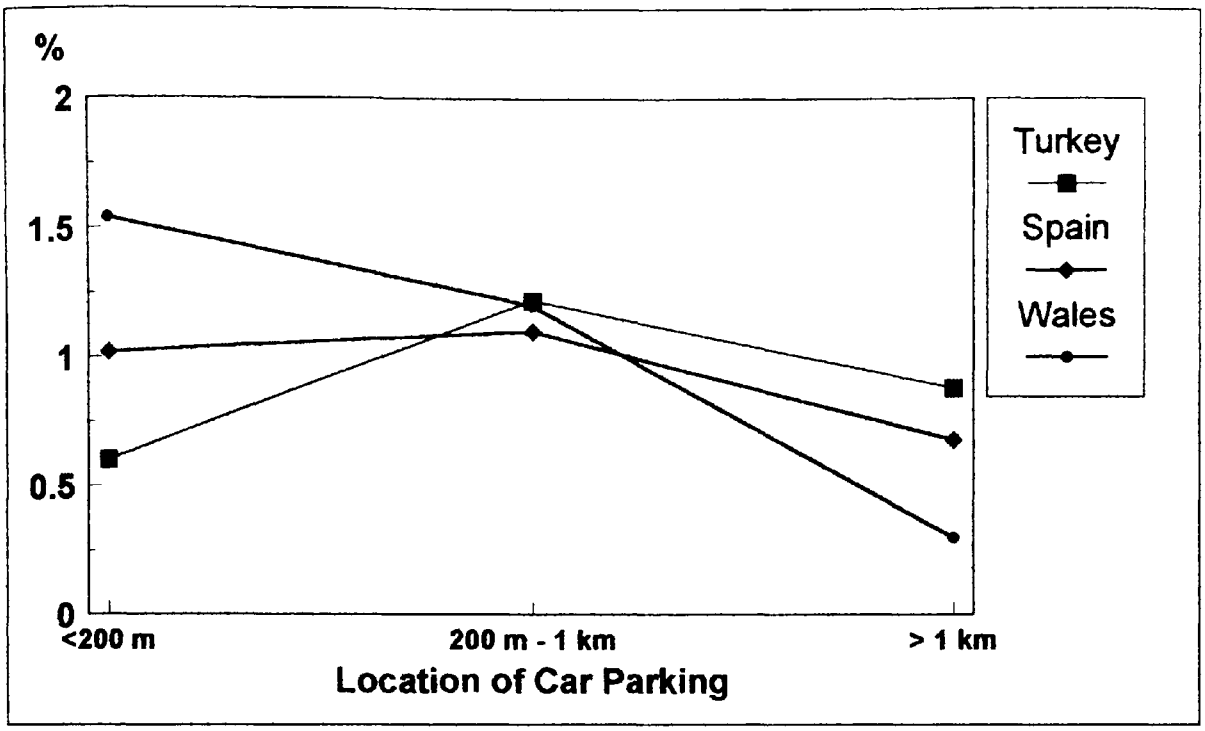


Fig. 7.9 Preference Scores for Car Parking Location - Wales, Spain and Turkey

Beach Width

In Spain there was a preference for narrower beach widths compared to Wales and Turkey. This may again reflect area of origin of the beach user sample, with the UK/north European beach users being accustomed to wider beaches (under low tide conditions in their home country), compared to the native Spanish sample's familiarity with narrow beaches.

Dog Bans

Eighty-five percent of beach users in Spain wanted to see dogs banned from the beach, compared to 95% at the Turkish Aegean Coast beaches examined and 83% in Wales.

7.5.3 Priority Levels

Some percentage priorities calculated for beach users in Wales, Spain and Turkey are shown in Table 7.1. Common high priority concerns across all 3 areas compared, were presence of public toilets (3.0 - 3.3%), cleanliness of toilets (3.4 - 4.1%), bathing water pollution levels (3.6 - 4.1%), absence of industrial odours/smells (3.4 - 3.7%), industrial/commercial noise (3.2 - 3.6%), absence of traffic fumes (3.1 - 3.5%), absence of sewage debris (3.5 - 3.9%), litter (3.5 - 4.0%) and oil (3.4 - 3.6%).

Beach Aspect	Mean Percentage		
	Turkey	Spain	Wales
Cleanliness of Toilets	4.1	3.6	3.4
Bathing Water Pollution Levels	3.6	4.1	3.6
Absence of Industrial Odours/Smells	3.6	3.7	3.4
Absence of Noise from Commerce/Industry	3.6	3.4	3.2
Absence of Visible Sewage Debris	3.5	3.9	3.6
Absence of Litter	3.5	4.0	3.5
Absence of Traffic Fumes	3.5	3.5	3.1
Absence of Oil on Beach	3.4	3.6	3.4
Presence of Adequate Public Toilets	3.3	3.3	3.0
Absence of Dangerous Cliffs/Rockfall	3.3	3.7	3.2
Hours of Sunshine	3.2	2.4	2.4
Clarity of Bathing Water	3.1	3.7	2.8
Fresh Water for Washing and Drinking	3.0	3.1	2.3
Presence of Lifeguards	2.7	3.7	2.6
Availability of Chairs/Sunbeds	2.3	1.5	1.2
Availability of Showers	2.2	3.1	1.3
Absence of Odours from Catering	2.1	2.8	1.5

Table 7.1 Percentage Priorities for Various Beach Factors - Wales, Spain and Turkey - Landscape/Scenery Excluded

Long hours of sunshine were given a high priority by beach users in Turkey (3.2%) compared to Spain and Wales (both 2.4%). A prime reason for north European visitors travelling to Mediterranean destinations is likely to be a desire for reliable weather including long periods of sunshine, reflected in the high priority

given to this factor by such beach users. Possibly, local Spanish beach users consider long sunshine duration less important as it is a natural phenomenon of the locality which can be taken for granted.

Priority for the presence of shower facilities was high in Spain (3.1%), compared to Turkey (2.2%) and Wales (1.3%). Presence of shower facilities for washing down is commonplace at Spanish beaches and native Spanish beach users are presumably accustomed to their presence at the beach. They therefore regard them as an important feature. This can be contrasted to the low priority given to long sunshine duration, which may be taken for granted as a natural phenomenon, as opposed to a provided facility. Shower facilities at beaches tend to be less common in northern Europe, hence north Europeans (in both Wales and Turkey), may regard them as less important.

Priority was low in Wales for absence of catering/food smells (1.5%) and highest in Spain (2.8%). Priority for availability of chairs/sunbeds was highest in Turkey (2.3%, where they are commonly provided at tourist beaches), compared to Spain (1.5%) and Wales (1.2%). Priority for lifeguard presence was highest in Spain (3.7%), compared to 2.7% in Turkey and 2.6% in Wales. Possibly nourishment of the Spanish beaches with associated water edge step and steep underwater profile, has generated concern for safety of small children when bathing.

7.5.4 Beach Rating Scores on the Turkish Aegean Coast

In terms of calculating beach rating scores, two major factors were omitted from calculations of beach user priority levels. Beach landscape/scenery was not assessed during this study for the reasons enumerated above (Chapter 7.4). Also, data on bathing water pollution levels (in terms of Total Coliforms, Faecal Coliforms, Faecal Streptococci, etc.), which would account for an average of 3.6% of total beach rating based on questionnaire responses, was not available for the beaches of the Turkish Aegean coast. Given the omission of these factors, the

rating scores obtained in this pilot study can only be taken as guidelines for their "true" ratings in terms of beach user preferences/priorities.

In terms of beach preference scores, four factors concerning climate in the beach resort area (sunshine, rainfall, temperature and wind speed), accounted for a total of 10.7% of the total. Four factors relevant to bathing safety accounted for a total of 10.1%. "Physical" factors (16 factors) accounted for 25% of the total preference score, compared to 21% for the 8 "biological" factors and 54% for "human use" factors (21). Scenery/landscape accounted for 14.0%. Compared to the percentages in the checklist of Williams *et al.,* (1993b; physical 36%, biological 20% and human use factors 44%), human use factors composed a substantially higher proportion of total beach preference score. However, if beach scenery/landscape had been included amongst physical factors and water pollution levels also included, the percentages would have been remarkably similar to those used by Williams *et al.,* (1993b), i.e. 33% (physical factors), 21% (biological factors) and 46% (human use factors) respectively, compared to 35%, 21% and 44% respectively used by Williams *et al.*, (1993b).

The calculated beach rating scores (Fig. 7.10), ranged from a high of 87% (Fethiye-Ölüdeniz) to a low of 69% (Marmaris Municipality Beach). The five beaches rated in this study were previously assessed by Williams *et al.,* (1993c) using the checklist described by Williams *et al.*, (1993b). Substantial discrepancies were found for two of these beaches; Marmaris Municipality, where Williams *et al.,* (1993c) obtained a score of 85% compared to 69% in this study and Fethiye-Belcegiz with scores of 85% and 74% respectively. The absence of scenery/landscape and microbiological water quality from the assessment (together accounting for 17.6% of the total score), and more emphasis on separately defined facilities in the checklist used for this study compared with that of Williams *et al.,* (1993b), could easily account for these discrepancies.

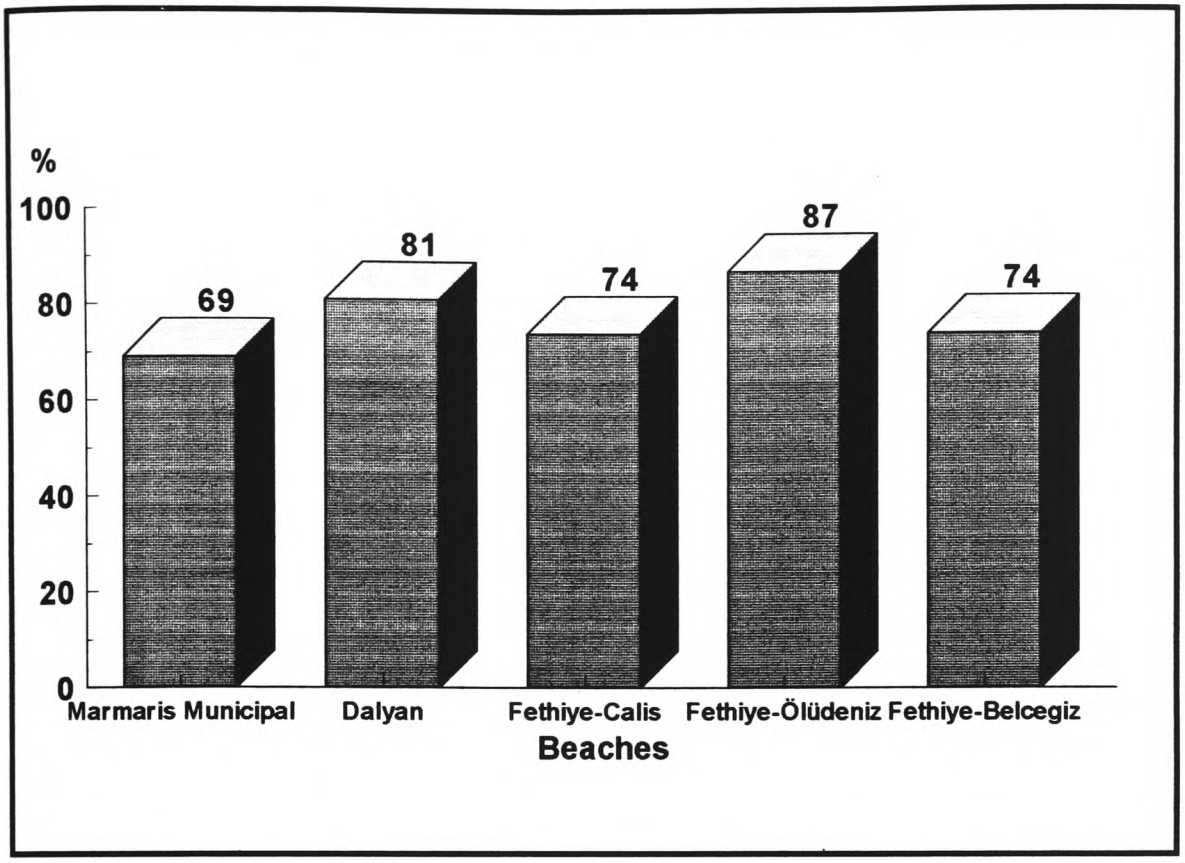


Fig. 7.10 Calculated Beach Rating Scores - Turkish Aegean Coast

7.6 Conclusions

The results of this comparative study raise many questions regarding the possible influence of locality, immediate environment, previous experience and country/region of origin on site-based questionnaire investigations of stated preferences and priorities. People's environmental perceptions are influenced by a variety of internal factors, which can have either a positive or negative influence on a person's attitude to, and perception of, their environment. When people visit a beach for the first time, they carry preconceived ideas of what they expect to see and experience. Their first impressions can be influenced by experience of similar environments previously encountered. These will be compared to the current environment and such a comparison may be favourable or unfavourable depending on previous experience.

If similar environments have not been previously encountered, one of two reactions may occur, depending on the person's background:

(i) The impression given by the environment may be so strong that the beauty or quality of the environment is not immediately appreciated. The environment then needs to be experienced for some time before its qualities are fully appreciated.

(ii) An immediate fondness for an environment, because it is so different to previous experience.

When a person becomes familiar with a location over a long period of time (for example, by living in the vicinity or by frequent visits), the location in some sense becomes part of the person's identity. When the location is modified, whether through direct or indirect human intervention (e.g. a morphological change in a beach, as in the example of the Spanish beaches examined), or other means, the effect is to disrupt the person's sense of identity. Often, the person will feel very uncomfortable with the change and voice protest against it. After a time however, memory of the location in its original state will fade and the changes will be viewed more objectively. In many Mediterranean tourist areas this aspect is very important because of the magnitude of human change to beach environments. This has involved urbanisation of long stretches of coastline (particularly in Spain), developments of large hotel/apartment complexes and more recently, marina construction and other coastal engineering works. Beach nourishment (particularly at the Spanish beaches studied), with resulting effects on beach width and morphology, is also of importance in this regard.

The possibility of site-specific influences on stated preferences and priorities, emphasises the requirement to avoid extrapolating user perceptions at a possibly atypical selection of sites or user sub-groups, to a larger population. This could be especially dangerous if the aim is to deduce management objectives for

other sites in the same area. If such studies are contemplated, the findings of these Mediterranean pilot studies emphasise the need to plan survey work very carefully with regard to sampling locations, sample size, sample profile with respect to origin of interviewees and the area and type of beach environments to which any recommendations may be extended. Much further work in this novel field of Mediterranean beach user perception studies is needed, especially with respect to comparison of visitors from various countries, population sub-groups and local users in particular beach areas. In management terms, cautious moderation of appropriately selected visitor perception data with carefully considered management principles, should be a basic guideline in the use of further studies of this type as an aid to planning.

CHAPTER 8

CONCLUSION

Beach users at four important beaches (Southerndown, Nash, Ogmore and Llantwit), at the Glamorgan Heritage Coast, Wales, were surveyed via a questionnaire with regard to their opinions and perceptions of the beach environment. Responses were compared to beach user socio-demographic information and responses to the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), and the Spielberger State-Trait Anxiety Inventory (Spielberger *et al.*, 1970). Important differences between the sites in terms of beach user perceptions and socio-demographic characteristics were identified. A close link was suggested between water quality and beach suitability for swimming. Few changes could be suggested to the general level of facilities at the study beaches, but a number of management recommendations were generated from interpretation of the survey data.

A model of the relationship between beach user parameters and beach selection was developed. Discriminant function analysis showed that from seven parameters tested (extroversion, anxiety/neuroticism, planned length of stay, distance travelled, gender, socio-economic status and age), four variables influenced the choice of beach. These were anxiety/neuroticism, gender, socio-economic status and planned length of stay. No reference could be found to previous study of beach selection in terms of such a wide range of user parameters. The practicality of using beach questionnaire survey techniques to investigate the opinions and perceptions of beach users was demonstrated.

A beach rating system was conceived and developed, based on the preferences and priorities of beach users themselves and taking into account all reasonably measurable beach parameters of importance to beach users. A comprehensive beach user questionnaire was devised and used to determine beach user priorities for 49 beach aspects, as well as preferences for 22 beach

aspects where preferred status could not be assumed. Beach users were sampled via the questionnaire at 23 Welsh beaches, generating 859 valid questionnaires. Analysis of this data in combination with stated preferred beach type in terms of level of commercialisation generated a scoring system which could be applied to a series of beach checklists, one for each beach type.

Characteristics of 70 Welsh beaches were assessed using a checklist, resulting in the production of percentage rating scores. Forty seven factors were eventually incorporated into the beach ratings. Landscape was assessed by filming a video panorama at each beach. The panorama sequence was submitted to judging by a panel of coastal zone managers and academics. Landscape scores ranged from 19% (Prestatyn) to 80% (Broadhaven, S. Pembs.). Visibility of built structures showed a striking negative correlation to mean landscape scores. Overall beach rating scores ranged from 39% (Porthcawl - Trecco Bay) to 69% (Broadhaven, S. Pembs. and Pembray). The rating system was considered to be more comprehensive than any in common use in the UK in terms of number of beach aspects assessed. It could also be considered superior in principle on the basis that it was able to take account of the differing beach user priorities for various beach aspects, and take account of differing preferences and priorities of beach users wishing to visit commercialised as opposed to undeveloped beaches.

Positive correlations were demonstrated between the percentage rating scores obtained in this study and award/recommendation status in terms of the European Blue Flag, Seaside Award and the Good Beach Guide. A considerable number of beach aspects taken account of in this study feature in assessments for the European Blue Flag and the Seaside Award, so some relationship between these awards and the results of this study could be expected. Since recommendation in the Good Beach Guide is essentially based only on microbiological water quality, it was less easy to see the reason for the apparent relationship.

For the great majority of beach aspects examined, important differences in beach user preferences and priorities were observed according to differences in stated preferred beach type. Many other important differences were seen in preferences and priorities according to beach user socio-demographic variables. No reference could be found to previous studies examining a large number of beach aspects in terms of user preferences or priorities, or attempts to relate such a range of opinions relating to the beach environment to socio-demographic aspects.

Pilot scale beach questionnaire studies were undertaken at the Costa Dorada, Spain and on the Turkish Aegean Coast. Five Turkish Aegean Coast beaches were also rated on the basis of questionnaire preference/priority data gathered from beach users in the area. Calculated beach rating scores ranged from 69% (Marmaris Municipality Beach) to 87% (Fethiye-Ölüdeniz).

From a perceptual viewpoint, the Mediterranean studies in particular supported the concept that environmental preferences can be heavily influenced by diverse aspects such as familiarity, expectation, cultural background and past experience of similar environments. As far as future studies are concerned, these influences on stated perceptions, preferences and priorities for the beach environment, emphasised the requirement to avoid extrapolating user information from a possibly atypical selection of sampling sites or user sub-groups, to larger populations. This would be especially dangerous if the aim was to use such studies to deduce management objectives for other sites in the same area. A clear need exists to plan survey work very carefully with regard to sampling locations, sample size, sample profile with respect to origin of interviewees and consider cautiously the area and type of beach environments to which any recommendations might be extended.

Results of future beach user perception studies are likely to depend on the measuring system used. This study was a pilot attempt to measure the preferences and priorities of beach users and it is not necessarily true that another study using

different measurement tools would obtain similar results at the same sites. Improved and modified questionnaires developed from the one used in this study (e.g. as used by Young *et al.*, 1996), might be quicker and more convenient to complete, while possibly yielding different results. Much more work needs to be done to deduce which tool (questionnaire or perhaps other system), would give the "correct" representation of beach user preferences and priorities - if such a "perfect" tool can ever be devised. Whether an "idealised" beach rating system reflecting users' desires can be constructed from preference/priority information is also a moot point, raising complex issues of psychology and cognition.

In Chapter 2.3, Appleton (1980) suggested that a numerical total obtained by adding two different monetary currencies was meaningless. It could be argued that adding scores for landscape, water quality, absence of litter, etc, to calculate a percentage rating score for a beach, is akin to this and of limited value in absolute (and perhaps even relative), terms. In the rating system used in this study, it would be possible for a beach to be totally deficient in a single important element (e.g. have badly polluted bathing water or be substantially contaminated with oil), and yet still record a high overall rating score. An important aspect of future beach rating studies of this type should be a requirement that beaches should meet minimum standards for a range of the most important beach aspects (as determined by beach user studies and depending on beach type), in order to achieve a particular overall rating level. This rating level could either be in terms of a percentage as in this study, or a numerical/alphabetical grade.

In this study, checklist aspects were divided into "physical", "biological" and "human use" parameters. Future beach rating exercises of this type should consider whether separate scores/grades for each of these parameters might not be of greater value than an overall beach rating score. Further investigation would be required to assess exactly which beach aspects could be grouped into a small number of sub-divisions, which would be meaningful to the general beach using public in terms of assisting choice of destination.

In order that future policies can take account of the human aspects of the coastal zone, ICZM needs to recognise the fact that the material elements of a coastal environment (e.g. water quality, landscape, litter, facilities), cannot be separated for public management purposes from people's interpretation of that environment. The importance of perception studies to examine these aspects and contribute to management, still appears largely unappreciated by coastal zone managers. The work undertaken in this study and the results obtained, offer indications of ways in which further, more detailed and wide ranging studies might be designed and used to assist management, tourism authorities and, most importantly, beach users themselves.

REFERENCES

Anantharaman, R.N. (1980). The effect of sex, social class and rural/urban locality on values. *Journal of Psychological Researches*, 24, (1 - 2), 112 - 114.

Anastassova, L. (1996). Unpublished presentation at training course in beach management in the Mediterranean and Black Sea, Malta, 11 - 17 May, 1996.

Appleton, J. (1975a). Landscape evaluation: the theoretical vacuum. *Transactions of the Institute of British Geographers*, 66, 120 - 123.

Appleton, J. (1975b). The experience of landscape. *Wiley*, 293 pp.

Appleton, J. (1976). The aesthetics of landscape (ed.). *Rural Planning Services Ltd.*, 288 pp.

Appleton, J. (1980). *David Linton's Contribution to Landscape Evaluation*. Dept. of Geog. Occasional Publication No. 13, University of Birmingham, 21 pp.

Archer, J.H. (1988). *Coastal zone management in the United States: a selective review and summary*. Coastal Resorces Centre, Univ. of Rhode Island, 24 pp.

ASHRAE (1972). Handbook of fundamentals. *New York: American Society of Heating, Refrigerating and Air Conditioning Engineers*. 112 pp.

Ballinger, R.C., Smith, H.D. & Warren, L.M. (1994). The management of the coastal zone of Europe. *Ocean & Coastal Management*, 22, 45 - 85.

Banerjee, T. (1977). Who values what?: audience reactions to coastal scenery. *Landscape Architecture*, 67, (3), 240 - 243.

Blalock, H.M., Jr. (1979). Social statistics, 2nd ed., *McGraw-Hill*, 625 pp.

Boerwinkel, H.W.J. (1992). Influencing zone visits in forests by design; a case of the small valley of Meijendel, (in:) J. Hummel, M. Parren (eds.), *Forests, a growing concern.* Proceedings of the XIXth International Forestry Students Symposium, Wageningen, The Netherlands, 30 September - 7 October 1991, Switzerland IUCN/ UK: Cambridge, 144 - 154.

Bosselmann, P. & Craik, H.K. (1989). Perceptual simulations of environments, (in:) R. Bechtel, R. Marans & W. Michelson, (eds.), *Methods in environmental and behavioral research*. New York: Van Nostrand Reinhold, pp. 162 - 190.

Bourassa, S.C. (1991). The aesthetics of landscape. *Belhaven Press,* 161 pp.

Breton, F. (1993). *La utilizacio i la percepcio de les platges a la provincia de Barcelona,* Institut d'Estudis Metropolitans de Barcelona, Universitat Autonoma de Barcelona, Spain, 249 pp.

Brown, J.M., Campbell, E.A., Rickards, A.D. & Wheeler, D. (1987). Sewage pollution of bathing water, *Lancet,* ii, 1208 - 1209.

Bruno, F.J. (1986). Dictionary of keywords in psychology. *Routledge & Kegan Paul,* 275 pp.

Brush, R.O. (1976). Perceived quality of scenic and recreational environments: some methodological issues, (in:) K.H. Craik and E.H. Zube, (eds.), *Perceiving environmental quality: research and applications*. New York: Plenum, pp. 47 - 58.

Brush, R.O. (1979). The attractiveness of woodlands: perceptions of forest landowners in Massachusetts. *Forest Science,* 25, (3), 495 - 506.

Buhyoff, G.J., Wellman, D.J., Koch, J.E., Gauthier, L. and Hultman, S. (1983). Landscape preference metrics: an international comparison. *Journal of Environmental Management*, 16, 181 - 190.

Burton, I. (1971). The social role of attitude and perception studies, (in:) W.R.D. Sewell & I. Burton (eds.), *Perception and attitudes in resource management*. Information Canada, Ottawa, 37 - 54.

Burton, I. & Kates, R.W. (1964). The perception of natural hazards in resource management. *Natural Resources Journal*, 3, 412 - 441.

Butler, R.W. (1991). Tourism, environment and sustainable development. *Environmental Conservation*, 18, (3), 201 - 209.

CAMPNET - Coastal area management and planning network (1989). *The status of integrated coastal zone management: a global assessment.* Summary report of a workshop convened at Charleston, South Carolina, July 4 - 9, Rosensteil School of Marine Sciences, University of Miami, 182 pp.

Carls, E.G. (1979). Coastal recreation: aesthetics and ethics. *Coastal Zone Management Journal*, 5, 119 - 130.

Ceredigion District Council (1991). Ceredigion's Coastal Heritage, 44 pp.

Ceredigion District Council (1992). Ceredigion Marine Heritage Coast: an introductory report, 32 pp.

Chaverri, R. (1989). Coastal management: the Costa Rica experience, (in:) *Coastal Zone '87*, O.T. Magoon, (ed.), Proc. 5th Symposium on Coastal and Ocean Management, Amer. Soc. Civ. Eng., 5, 1112 - 1124.

Clamp, P.E. (1976). Evaluating English landscapes. *Environment and Planning*, 8, 79 - 92.

Council of the European Communities (1976). Council Directive of 8 December 1975 concerning the quality of bathing water, 76/160/EEC. *Official Journal of the European Community*, 19 (L31), 1 - 7.

Countryside Commission (1970). The Coastal Heritage. *HMSO.* 52 pp.

Countryside Commission (1991). Heritage Coasts: Policies and priorities. CCP 305, 11 p.p.

Craik, K.H. (1972). Appraising the objectivity of landscape dimensions, (in:) J.V. Krutilla (ed.), *Natural Environments: Studies in Theoretical and Applied Analysis.* Baltimore: John Hopkins University Press, 292 - 346.

Cullen, P. (1982). An evaluation of the Heritage Coast programme in England and Wales. *Countryside Commission*, 73 p.p.

Cutter, S.L., Nordstrom, K.F. & Kucma, G.A. (1979). Social and environmental factors influencing beach site selection. *Proc. Fifth Ann. Conf. on Resource Allocation Issues in the Coastal Environment,* West, N. (ed.), the Coastal Society, 183 - 194.

Danilova, N.A. (1974). A recreational evaluation of the climate of the Black Sea Coast. *Meteorological Translations*, No. 25, Atmospheric Environment Service, Canada, Department of the Environment, Toronto, 17 - 31.

Danilova, N.A. (1976). Klimaticheskiye uslovia prigorodnogo otdykha na Yevorpeyskoy territorri SSR, (in:) *Rekreatsionaya geografia*, Moskva: Moskovskiy filial GOSSSR, 106 - 109.

David, E.L. (1971). Public perceptions of water quality. *Water Resources Research*, 10, 453 - 457.

Davies, P. & Williams, A.T. (1991a). Sediment supply from solid geology cliffs into the intertidal zone of the Severn Estuary/Inner Bristol Channel. *U.K. Estuaries and Coasts: Spatial and Temporal Intercomparisons, ECSA 19 Symposium*, M. Elliot & J.P. Ducrotoy, (eds.), 17 - 24.

Davies, P. & Williams, A.T. (1991b). The enigma of the destruction of Colhuw port, Llantwit Major, Wales, U.K. *The Geographical Review*, 81, (3), 259 - 266.

Davies, P., Williams, A.T. & Bomboi, P. (1991). Numerical modelling of Lower Lias rock failures in the coastal cliffs of South Wales, UK. *Coastal Sediments '91*, N.C. Kraus, K.J. Gingerlich & D.L. Kriebel (eds.), Amer. Soc. Civ. Eng., 1599 - 1612.

De Frietas, C.R. (1985). Assessment of human bioclimate based on thermal response. *International Journal of Biometeorology*, 29, 97 - 119.

De Frietas, C.R. (1990). Recreation climate assessment. *International Journal of Climatology,* 10, 89 - 103.

Dearden, P. (1980). Towards protection of scenic resources. *Environmental Conservation*, 7, (2), 21 - 28.

Dinius, S.H. (1981). Public perceptions of water quality evaluation. *Water Resources Bulletin*, 17, (1), 116 - 121.

Driscoll, A., Lawson, R. & Niven, B. (1994). Measuring tourists' destination perceptions. *Annals of Tourism Research*, 21, (3), 499 - 511.

Eastwood, D.A. & Carter, R.W.G. (1984). The Irish dune user. *Journal of Leisure Research*, 13, (4), 273 - 281.

Eleftheriadis, N., Tsalikidis, I. & Manos, B. (1990). Coastal landscape preference evaluation: A comparison among tourists in Greece. *Journal of Environmental Management*, 14, (4), 475 - 487.

Eysenck, H.J. & Eysenck, S. (1963). The Eysenck Personality Inventory. *Hodder and Stoughton Educational.* 42 pp.

Eysenck, H.J. & Eysenck, S.B.G. (1975). Manual of the Eysenck Personality Test. *Hodder and Stoughton Educational.* 28 p.p.

Fabbri, P. (1996). Unpublished presentation to LITTORAL '96 Conference, Portsmouth, 16 - 19 September.

Fanger, P.O. (1970). Thermal comfort. *Danish Technical Press.* 67 pp.

FEEE (1994). The Blue Flag Campaign. *FEEE*, 16 pp.

Fines, K.D. (1968). Landscape evaluation: A research project in East Sussex. *Regional Studies*, 2, 41 - 55.

Gerlach. J. (1991). Tourism and its impact on the Costa del Sol, Spain. *Focus*, 41, (3), 7 - 11.

Glamorgan County Council (1973). Cardiff - Porthcawl coastal study consultation report, *County Planning Department*, 51 p.p.

Glamorgan Heritage Coast Management and Advisory Committee (1976). Glamorgan Heritage Coast plan statement, *Mid-Glamorgan County Council.* 64 pp.

Green, J.S.A. (1967). Holiday meteorology: reflections on weather and outdoor comfort. *Weather*, 128 - 131.

Grimes, J.N. (1986). The engineering geology and stability of rapidly alternating limestone and mudrock sea cliffs of Glamorgan. Unpublished Ph.D. Thesis, C.N.A.A./Polytechnic of Wales, 293 p.p.

Gubbay, S. (1991). Coastal zone management. *ECOS*, 12, (2), 2 - 6.

Hallam, A. (1960). A sedimentary and faunal study of the Blue Lias of Dorset and Glamorgan," *Philosophical Transactions of the Royal Society*. B 243, 144 - 157.

Harris, P.T. (1984). Patterns of sediment transport in the Bristol Channel. Unpublished Ph.D. Thesis, University of Wales.

Hatziolos, M. & Trumbic, I. (1996). Preliminary results of an assessment of coastal zone management initiatives in the Mediterranean, (in:) E. Ozhan (ed.), *Proceedings of the International Workshop on Med & Black Sea ICZM*, November 2-5, Sarigerme, Turkey, 1 - 2.

Hawkins, D.E. & Brent-Richie, J.R. (1991). World travel and tourism: Trends and forecasts. *CAB International*, 243 pp.

Hersen, M. & Bellack, A.S. (1988). Dictionary of behavioural assessment techniques. *Pergamon*, 519 pp.

Hodgeson, P. (1983). Research into the complex nature of the holiday choice process, (in:) *The Importance of Research in the Tourism Industry*, Esomar, Helsinki, seminar proceedings, 17 - 45.

House, M.A. & Sangster, E.K., (1991). Public perception of river corridor management. *Journal Inst. Water and Environmental Management*, 15, (3), 312 - 317.

House, M.A. & Herring, M. (1995). Aesthetic pollution public perception survey - report to Water Research Centre. *Flood Hazard Research Centre, Middlesex University*, 40 pp.

Howard, D.R. (1976). Multivariate relationships between leisure activities and personality. *Research Quarterly*, 47, (2), 226 - 237.

Howe, G.M. & Thomas, P. (1963). Welsh Landforms and Scenery. *MacMillan*. 551 pp.

Hull, R.B. IV & Buhyoff, G.J. (1983). Distance and scenic beauty: A nonmonotonic relationship. *Environment and Behavior,* 15, (1), 77 - 91.

Hull, R.B. IV & Stewart, W.P. (1992). Validity of photo-based scenic beauty judgements. *Journal of Environmental Psychology*, 12, 101 - 114.

Iso-Ahola, S. (1982). Toward a social psychological theory of tourism motivation: a rejoinder. *Annals of Tourism Research*, 9, (2), 256 - 262.

Jackson, R.H. & Hudman, L.E. (1978). Assessment of the environmental impact of high voltage power transmission lines. *Journal of Environmental Management*, 6, 153 - 170.

Jensen, F.S. (1993). Landscape managers' and politicians' perception of the forest and landscape preferences of the population. *Forest and Landscape Research*, 1, 79 - 93.

Jones, D.G. & Williams, A.T. (1991). Statistical analysis of factors influencing coastal erosion along a section of the West Wales coast, *Earth Processes and Landforms,* 16, (2), 95 - 112.

Kabanoff, B. (1981). Validation of a task attributes description of leisure. *Australian Journal of Psychology*, 33, (3), 383 - 391.

Kaplan, S., Kaplan, R. & Wendt, J.S. (1972). Rated Preference and Complexity for Natural and Urban Visual Material. *Perceptions in Psychophysics*, 12, 354 - 356.

Kaplan, S. (1975). An informed model for the prediction of preference, (in:) E.H. Zube, R.O. Brush & J.G. Fabos, (eds.), *Landscape Assessment*, 92 - 101, Dowden, Hutchinson and Ross Inc.

Kelly, J.R. (1975). Life styles and leisure choices. *Family Coordinator*, 24, (22), 185 - 190.

Kenchington, R. (1992). Tourism in coastal and marine environments - a recreational perspective. *Ocean & Coastal Management*, 19, 1 - 16.

Koch, N.E. & Jensen, F.S. (1988). Forest recreation in Denmark - part IV: The preferences of the population. *Forstl. Forsogsv. Danm.*, Kobenhavn, 41, 243 - 516.

Lant, C.L. & Muliens, J.B. (1991). Lake and river quality for recreation management and contingent valuation. *Water Resources Bulletin*, 27, 453 - 460.

Laurie, I.C. (1975). Aesthetic factors in visual evaluation, (in:) E.H. Zube, (ed.), *Landscape assessment.* Community Development Series, 102 - 117.

Lickorish, L.J. (1988). UK tourism development - a 10-year review. *Tourism Management,* 9, (4), 270 - 278.

Llanelli Joint Venture (1995). Llanelli coastal park - design concept. *Carmarthenshire County Council*, 15 pp.

London, H. & Exner, J.E., Jr. (1978). Dimensions of personality. *Wiley-Interscience*, 620 pp.

Marine Conservation Society (1990). Issue paper 2 - Marine Recreation, 18 pp.

Marine Conservation Society (1994). Reader's digest good beach guide - 1994. *David & Charles*, 224 pp.

Marine Conservation Society (1995). Reader's digest good beach guide - 1995. *David & Charles*, 256 pp.

Marine Conservation Society (1996). Reader's Digest Good Beach Guide - 1996. *David & Charles*, 253 pp.

Martin, W. H. & Mason, S. (1993). The future for attractions: Meeting the needs of the new consumers. *Tourism Management*, 14, (1), 34 - 40.

McCrickard, A. (1994). A survey of beach litter on Gower Peninsula, South Wales. Unpublished BSc. Thesis, University of Glamorgan. 76 pp.

Mieczkowski, Z. (1985). The tourism climate index: A method of evaluating world climates for tourism. *The Canadian Geographer*, 29, (3), 220 - 233.

Mileti, D.S., Drabek, T.E., Thomas, E. & Haas, J.E. (1975). Human systems in extreme environments: a sociological perspective. *Progress on Technology, Environment and Man*. Institute of Behavioural Sciences, University of Colorado. Monograph No. 21, 25 pp.

Miller, M.L. (1993). The rise of coastal and marine tourism, *Ocean & Coastal Management,* 20, 181 - 199.

Morgan, R., Jones, T.C. & Williams, A.T. (1993). Opinions and perceptions of England and Wales Heritage Coast beach users: some management implications from the Glamorgan Heritage Coast, Wales. *Journal of Coastal Research*, 9, (4), 1083 - 1093.

Morgan, R., Bursalioglu, B., Hapoglu-Balas, L., Jones, T.C., Özhan, E. & Williams, A.T. (1995). Beach user opinions and beach ratings: A pilot study on the Turkish Aegean Coast, (in:) *MedCoast '95*, E. Özhan (ed.), METU, Ankara, Turkey, 373 - 383.

Morgan, R. & Williams, A.T. (1995). Socio-demographic parameters and user priorities at Gower beaches, Wales, UK, (in:) M.G. Healy & J.P. Doody, (eds.), *Directions in European Coastal Management*, Samara Publishing Limited, Cardigan, UK, 83 - 90.

Mullard, J., Atkins, J., Hughes, M.R., Sell, S. & Winder, M. (1996). The Gower Peninsula, Wales, UK, (in:) P.S. Jones, M.G. Healy & A.T. Williams, (eds.), *Studies in European Coastal Management*, Samara Publishing Limited, Cardigan, UK, 1996, 269 - 274.

Nassauer, J.I. (1982). Framing the landscape in photographic simulation. *Journal of Environmental Management*, 17, 1 - 16.

National Rivers Authority (1991). Bathing waters report, Welsh Region, 39 pp.

National Rivers Authority (1994). Bathing water quality in England and Wales - 1993, *HMSO*, 52 pp.

Nias, D.K. (1977). The structuring of recreational interests, *Social Behaviour and Personality*, 5, (2), 383 - 388.

Nicholson, J.A. & Mace, A.C., Jr. (1975). Water quality perception by users: can it supplement objective water quality measures? *Water Resources Bulletin*, 11, 1197 - 1207.

Norusis, M.J. (1988). SPSS/PC+: Base system user's guide. *SPSS Inc.*, 800 pp.

Norusis, M.J. (1993). SPSS for Windows: Base system user's guide: Release 6.0. *SPSS Inc.*, 768 pp.

OECD (1990). Coastal resource management. Draft report no. ENV/NRM/90.11, *OECD Environment Directorate*. 153 pp.

Office of Population Censuses and Surveys (1980). Classification of occupations. *HMSO.* 114 pp.

Office of Population Censuses and Surveys (1991). Standard occupational classification. *HMSO.* 56 pp.

Oppenheim, A.N. (1966). Questionnaire design and attitude measurement. *Heinemann*, 394 pp.

Orbach, M. (1996). Science and policy in the coastal zone, (in:) J. Taussik & J. Mitchell, (eds.), *Partnership in Coastal Zone Management*, Samara Publishing Limited, Cardigan, UK, 7 - 13.

Owen, C. (1990). Better days at the seaside - can UK resorts learn from the European experience?, *Tourism Management*, 11, (3), 190 - 194.

Özhan, E. (1991). Coastal zone management and tourism. Unpublished presentation at conference on Coastal zone management: An integrated approach, May 20 - 22, 1991, Cesme-Izmir, Turkey.

Parker, W.R. & Kirby, R. (1982). Sources and transport patterns of sediment in the Inner Bristol Channel and Severn Estuary, (in:) T. Shaw (ed.), *Severn Barrage, Symposium Proceedings of Institute of Civil Engineering*, Thetford Press, 181 - 194.

Paul, A.H. (1972). Weather and the daily use of outdoor recreation areas in Canada, (in:) J.A. Taylor (ed.), *Weather forecasting for agriculture and industry*, David and Charles, Newton Abbot, 132 - 146.

PCNP (1977). Pembrokeshire Coast National Park committee, Pembrokeshire Coast National Park plan 1977 - 1982, 186 pp.

PCNP (1994). Pembrokeshire Coast National Park committee, Pembrokeshire Coast National Park local plan - consulation draft part 1 - general policies, 99 pp.

Penning-Rowsell, E.C. (1982). A public preference evaluation of landscape quality, *Regional Studies*, 16, (2), 97 - 112.

Peterson, G.L & Neumann, E.S. (1969). Modelling and predicting human response to the visual recreation environment, *Journal of Leisure Research,* 1, 219 - 237.

Phillip, R. (1990). Aesthetic health indicators and recreational water quality appraisal, Environmental Epidemiology Report No. 106, *University of Bristol.* 23 pp.

Roberts, B.M. (1959). Environmental testing, *Journal of the Institute of Heating and Ventilation Engineering*, 27, 238 - 250.

Robinson, D.G., Wager, J.F., Laurie, I.C. and Trail, A.L. (1976). Landscape evaluation: The landscape evaluation research project, 1970 - 75, *University of Manchester*, 245 p.p.

Rohles, F.H., Jr. (1974). The modal comfort envelope and its use in current standards, *Human Factors*, 16, 314 - 322.

Saarinen, T.F. (1966). Perception of the drought hazard on the Great Plains, Research Paper No. 106, *Department of Geography, University of Chicago*. 199 pp.

Saarinen, T.F. (1976). Environmental planning, perception and behavior, *Houghton Mifflin.* 262 pp.

Saliba, L.J. (1990a) Making the Mediterranean safer. *World Health Forum*, 11, (3), 274 - 281.

Saliba, L.J. (1990b). Coastal land use and environmental problems in the Mediterranean, *Land Use Policy*, 7, (3), 217 - 230.

Sen, A. (1976). A study of the personality makeup and off-the-job activities in a group of executives. *Indian Journal of Applied Psychology*, 13, (1), 42 - 46.

Schroeder, H.W. and Daniel, T.C. (1980). Predicting the scenic quality of forest road corridors. *Environment and Behavior*, 12, 349 - 366.

Schroeder, H.W. and Daniel, T.C. (1981). Progress in predicting the perceived scenic beauty of forest landscapes, *Forest Science,* 27, 71 - 80.

Schroeder, H.W. (1984). Environmental perception rating scales: A case for simple methods of analysis. *Environment and Behavior*, 16, (5), 573 - 598.

Scott, G. (1972). Plastic packaging and coastal pollution. *Journal of Environmental Studies*, 3, 35 - 36.

Shafer, E., Hamilton, J. & Schmidt, E. (1969). Natural landscape preferences: a predictive model. *Journal of Leisure Research*, 1, (1), 1 - 19.

Shafer, E.L. and Tooby, M. (1973). Landscape preferences: An international comparison. *Journal of Leisure Research*, 5, 60 - 65.

Short, A.D. (1993). Beaches of the New South Wales Coast. *Australian Beach Safety and Management Programme*, 358 pp.

Shuttleworth, S. (1980). The use of photographs as an environmental presentation medium in landscape studies. *Journal of Environmental Management*, 11, 61 - 76.

Simmons, S.L. & Williams, A.T. (1992). Persistent marine debris along the Glamorgan Heritage Coast, Wales, UK; a management problem, (in:) H. Sterr, J. Hofstide & P. Plag (eds.), *Interdisciplinary discussions of coastal research and coastal management issues*, Peter Lang, Frankfurt, 240 - 250.

Simmons, S.L. & Williams, A.T. (1994). Sewage related debris, (in:) R. Earll, (ed.) *Marine Environmental Management: Review of Events in 1993 and Future Trends*, 1, 45 - 48.

Smith, D.G., Cragg, A.M. & Croker, G.F. (1991). Water clarity criteria for bathing waters based on user perception. *Journal of Environmental Management*, 33, 285 - 299.

Smith, H.D. (1991). The present and future of coastal zone management in the UK. *Land Use Policy*, 8, (2), 125 - 132.

Smith, H.D. & Lalwani, C.S. (1992). The future development of sea use management in Europe. *Ocean & Coastal Management*, 18, 187 - 196.

Smith, R.A. (1991). Beach resorts: a model of development evolution. *Landscape and Urban Planning,* 21, 189 - 210.

Sorensen, J.C. (1990). An assessment of Costa Rica's coastal management program. *Coastal Management Journal*, 18, (1), 37-63.

Sorensen, J.C., McCreary, S.T. (1990). Institutional arrangements for the managing of coastal resources and environments (2nd edn). Renewable Resources Informational Series, Coastal Management Publication No. 1, *US National Park Service.*

Spielberger, C.D., Gorsuch, R.L. & Luschene, R.E. (1970). STAI manual for the State-Trait Anxiety Inventory. *Consulting Psychologist's Press Inc.,* 24 pp.

Steers, J.A. (1948). The coastline of England and Wales. *Cambridge University Press.* 644 pp.

Stevenson, T.H.C. (1928). The vital statistics of wealth and poverty. *Journal of the Royal Statistical Society*, Vol. XCI, 207 - 230.

Stouffer, S.A. (1950). Measurement and prediction. *Princeton University Press,* 244 pp.

Swansea City Council (1987). Gower management plan consultation draft, 164 pp.

Terjung, W.H. (1966). Physiological climates of the conterminous United States: a bioclimatic classification based on man. *Annals of the Association of American Geographers*, 56, 141 - 179.

Trueman, A.E. (1922). The Liassic rocks of Glamorgan. *Proceedings of the Geological Association*, 24, (33), 245 - 284.

Trueman, A.E. (1949). Geology and scenery in England and Wales. *Penguin.* 245 pp.

Ulrich, R.S. (1977). Visual landscape preference: A model and application. *Man-Environment Systems*, 7, 279 - 293.

Vale of Glamorgan Borough Council (1980). Barry - Penarth coastal plan: Report of survey - summary. 37 pp.

Van Deurzen, A. & Van Oers, H. (1984). Social identity and equity in intergroup perception. *British Journal of Social Psychology*, 23, 351 - 363.

Wales Tourist Board (1994). Tourism 2000 - A strategy for Wales, 109 pp.

Wellman, J.D. and Buhyoff, G.J. (1980). Effects of regional familiarity on landscape preference. *Journal of Environmental Management*, 11, 105 - 110.

Welsh Agricultural College (1992). South Wales recreation site survey 1991: Planning for the future. 73 p.p.

Wheeler, D. (1990). The pollution of beaches by viruses, (in:) Environment Committee, Fourth Report, *Pollution of Beaches*, III, HMSO, 379 - 394.

Williams, A.T. (1986). Coastal geology and Heritage Coast management in South and West Wales. *Thalassas,* 4, (1), 109 - 115.

Williams, A.T. (1987). Coastal conservation policy development in England and Wales, with special reference to the Heritage Coast concept. *Journal of Coastal Research*, 3, (1), 99 - 106.

Williams, A.T. (1990). Management strategies for coastal conservation in South Wales, UK, (in:) P. Fabbri (ed.), *Recreational Uses of Coastal Areas*, Kluwer Academic Publishers, 19 - 38.

Williams, A.T. (1992). The quiet conservators: Heritage Coasts of England and Wales. *Ocean & Coastal Management*, 17, 151 - 167.

Williams, A.T. & Davies, P. (1980). Man as a geological agent: the sea cliffs of Llantwit Major, Wales, UK. *Z. Geomorph. N.F.*, Suppl. - Bd. 34, Berlin-Stuttgart, 129 - 141.

Williams, A.T. & Davies, P. (1984). Cliff failures along the Glamorgan Heritage Coast, Wales, UK. *Movements de Terr.*, Assoc. Franc. de Geog. Phys., Serie Doc. du BRGM 83, Uni. de Caen, 109 - 119.

Williams, A.T. & Davies, P. (1987). Rates and mechanisms of coastal cliff erosion in Lower Lias rocks, (in:) *Coastal Sediments '87*, Kraus, N.C. (eds.), Amer. Soc. Civ. Eng., Vol. II, 1855 - 1870.

Williams, A.T., Gardner, W., Jones, T.C., Morgan, R. & Özhan, E. (1993a). A psychological approach to attitudes and perceptions of beach users: Implications for coastal zone management, (in:) MedCoast '93, E. Özhan (ed.), METU, Ankara, Turkey, 218 - 228.

Williams, A.T. & Howden, J.C.W. (1979). The search for the coastal ethos: the Glamorgan Heritage Coast, Wales, U.K. *Shore and Beach*, 47, (3), 17 - 21.

Williams, A.T. & Howden, J.C.W. (1985). Innovative management in a time of austerity: the GHC experience, (in:) *Proceedings of the Coastal Zone '85*, O.T. Magoon (ed.), Amer. Soc. Civ. Eng., 26 - 35.

Williams, A.T., Jones, T.C., Davies, P. & Curr, R. (1992). Psychological profile of the beach dune user in South Wales, UK. *Shore and Beach*, 60, (2), 26 - 30.

Williams, A.T., Jones, T.C. & Özhan, E. (1993c). A preliminary investigation of beach aesthetics for theAntalya to Izmir coastline of Turkey. Unpublished report to the British Council, Ankara, Turkey, 17 pp.

Williams, A.T. & Lavalle, C.D. (1990). Coastal landscape evaluation and photography. *Journal of Coastal Research*, 6, (1), 1011 - 1020.

Williams, A.T., Leatherman, S.P. & Simmons, S.L. (1993b). Beach aesthetic values: the South West Peninsula, UK, (in:) *Interdisciplinary discussions of coastal research and coastal management issues and problems*, H. Sterr, J. Hofstide & P. Plag (eds.), Peter Lang, Frankfurt, 240 - 250.

Williams, A.T. & Morgan, R. (1995). Beach awards and rating systems. *Shore & Beach*, 63, (4), 29 - 33.

Williams, A.T. & Morgan, R. (1995). Aspects of physical and cultural parameters associated with coastal zone management along the Ceredigion Heritage Coast, Wales, UK, (in:), *Proceedings of the international conference "Coastal Change 95"*, E. Duursma (ed.), Bordomer-IOC, Bordeaux, 850 - 863.

Williams, A.T. & Randerson, P.F. (1989). Nexus: Ecology, recreation and management of a dune system in South Wales, (in:) *Perspectives in coastal dune management*, F. van der Muelen, P.D. Jungerius & J.H. Visser (eds.), 217 - 227, SPB Publishing, The Hague, Netherlands, 217 - 227.

Williams, A.T. & Simmons, S.L. (1995). Sources and sinks of litter, (in:) R. Earll, (ed.), *Coastal and riverine litter: Problems and effective solutions,* 14 - 18.

Williams, A.T. & Simmons, S.L. (1996). The degradation of plastic litter in rivers: implications for beaches. *Journal of Coastal Conservation*, 2, 63 - 72.

Williams, A.T. & Simmons, S.L.. (in press; *Journal of Coastal Research*). Estuarine litter at the river/beach interface in the Bristol Channel, UK.

Williams, A.T. & Sothern, E.J. (1986). Recreational pressure on the Glamorgan Heritage Coast, South Wales, UK. *Shore and Beach*, 54, (1), 30 - 37.

Williams, A.T. & Williams, M.J. (1988). The perception of, and adjustment to, rockfall hazards along the Glamorgan Heritage Coast, Wales, UK. *Journal of Ocean & Shoreline Management*, 11, 319 - 339.

Winslow, C.-E.A., Herrington, L.P. & Gagge, A.P. (1937). Relations between atmospheric conditions, physiological reactions and senstions of pleasantness, *American Journal of Hygrology,* 26, 103 - 115.

Winslow, C.-E.A., Herrington, L.P. & Gagge, A.P. (1938). Physiological reactions and sensations of pleasantness under varying atmospheric conditions, *ASHRAE Transactions*, 44, 179 - 194.

Wolpe, J. (1980). Psychotherapy, the reciprocal inhibitor. *California University Press*, 283 p.p.

Yapp, G.A. & McDonald, N.S. (1978). A recreation climate model, *Journal of Environmental Manage*ment, 7, 235 - 252.

Yeomans, G.J. (1967). Systematic Planning for Water Recreation. Unpublished Thesis for Diploma in Town Planning, University of Birmingham, 164 pp.

Young, C., Barugh, A., Morgan, R. & Williams, A.T. (1996). Beach user perceptions and priorities at the Pembrokeshire Coast National Park, Wales, UK, (in:) J. Taussik & J. Mitchell, (eds.), *Partnership in Coastal Zone Management*, Samara Publishing Limited, Cardigan, UK., 111-118.

Zile, Z. (1974). A legislative-political history of the Coastal Zone Management Act of 1972. *Coastal Zone Management Journal*, 1, (3), 235-274.

Zube, E.H. (1973). Rating everyday rural landscapes of the Northeastern U.S. *Landscape Architecture*, 63, 370 - 375.

Zube, E.H. (1984). Themes in landscape assessment theory. *Landscape Journal*, 3, 104 - 110.

Zube, E.H. (1987). Perceived land use patterns and landscape values. *Landscape Ecology*, 1, (1), 37 - 45.

Zube, E.H. & Pitt, D.G. (1981). Cross-cultural perceptions of scenic and heritage landscapes. *Landscape Planning*, 8, 69 - 87.

Zube, E.H., Simcox, D.E. & Law, C.S. (1987). Perceptual landscape simulations. *Landscape Journal*, 6, 62 - 80.

APPENDICES

Appendix 1

Glamorgan Heritage Coast Pilot Questionnaire

AGE ..... SEX.....

OCCUPATION.....

HOW FAR HAVE YOU TRAVELLED TODAY (IN MILES).....

HOW LONG DO YOU INTEND STAYING ON THE BEACH (IN HOURS).....

DID YOU KNOW THIS BEACH WAS PART OF THE HERITAGE COAST? YES NO

PLEASE CIRCLE THE NUMBER NEXT TO EACH OF THE FOLLOWING SETS OF STATEMENTS THAT BEST INDICATES THE WAY YOU FEEL ABOUT THIS PARTICULAR BEACH.

THIS BEACH IS:

too quiet	1	2	3	4	5	6	7	8	9	very noisy
too few people	1	2	3	4	5	6	7	8	9	too many
too many rock pools	1	2	3	4	5	6	7	8	9	too few rock pools
overabundance of sand	1	2	3	4	5	6	7	8	9	insufficient amount of sand
too great an expanse of sand	1	2	3	4	5	6	7	8	9	insufficient expanse of sand
sand is too soft	1	2	3	4	5	6	7	8	9	sand is very harsh
too great an expanse of grass	1	2	3	4	5	6	7	8	9	insufficient expanse of grass
tidal range too high	1	2	3	4	5	6	7	8	9	tidal range not high enough
too open/exposed/public	1	2	3	4	5	6	7	8	9	too closed/secluded/isolated
too much shelter from wind	1	2	3	4	5	6	7	8	9	too little shelter from wind
beach area is too commercialised	1	2	3	4	5	6	7	8	9	beach area is not commercialised enough
beach area has too many facilities	1	2	3	4	5	6	7	8	9	beach area does not have enough facilities

What does commercialisation mean to you?.....

,.....

,.....

THIS BEACH IS/HAS:

very attractive beach relief	1	2	3	4	5	6	7	8	9	very unattractive relief
very pleasing odours/smells	1	2	3	4	5	6	7	8	9	very unpleasant odours/smells
adequate number of toilets	1	2	3	4	5	6	7	8	9	not enough toilets
exceptionally clean toilets	1	2	3	4	5	6	7	8	9	extremely filthy toilets
adequate disabled toilet facility	1	2	3	4	5	6	7	8	9	no disabled toilet facility
excellent beach access	1	2	3	4	5	6	7	8	9	difficult/poor beach access
good disabled beach access	1	2	3	4	5	6	7	8	9	difficult/poor disabled beach access
sufficient easy access walks	1	2	3	4	5	6	7	8	9	inadequate easy access walks
walks/footpaths have very good views	1	2	3	4	5	6	7	8	9	walks/footpaths have no views
walks/footpaths are interesting	1	2	3	4	5	6	7	8	9	walks/footpaths are uninteresting
very good refreshment facilities	1	2	3	4	5	6	7	8	9	very poor refreshment facilities
excellent car parking facility	1	2	3	4	5	6	7	8	9	very poor car parking facilities
excellent seating facilities provided	1	2	3	4	5	6	7	8	9	no seating facilities provided
exceptionally clean water	1	2	3	4	5	6	7	8	9	exceptionally filthy water
water is in pristine condition	1	2	3	4	5	6	7	8	9	water is extremely poluted
excellent beach for swimming	1	2	3	4	5	6	7	8	9	appalling beach for swimming

Why?.....

,.....

,.....

exceptionally safe waters	1	2	3	4	5	6	7	8	9	exceptionally dangerous waters
exceptionally safe playing	1	2	3	4	5	6	7	8	9	exceptionally unsafe playing areas
excellent lifeguard protection	1	2	3	4	5	6	7	8	9	no lifeguard protection

Why.....

,.....

,.....

no threat of crime on the beach	1	2	3	4	5	6	7	8	9	enormous threat of crime on the beach
no litter on the beach	1	2	3	4	5	6	7	8	9	great amount of litter on the beach at all
no animal waste on the beach	1	2	3	4	5	6	7	8	9	great amount of animal waste on the beach
extensive amount/variety of wildlife	1	2	3	4	5	6	7	8	9	no wildlife present in beach area
extensive variety of plant life	1	2	3	4	5	6	7	8	9	no plant life present in beach area
no irritation from pests (flies)	1	2	3	4	5	6	7	8	9	great irritation from pests (flies etc)

WHAT, IN YOUR OPINION, IS THE BEST BEACH YOU HAVE EVER VISITED?

,.....

Why?.....
,.....
,.....

WHAT, IN YOUR OPINION, IS THE WORST BEACH YOU HAVE EVER VISITED?

,.....

Why?.....
,.....
,.....

WE WOULD LIKE TO KNOW HOW THIS BEACH COMPARES WITH THOSE WHICH YOU HAVE IDENTIFIED ABOVE.

THIS BEACH IS SIMILAR IN QUALITY TO:

the best beach I have ever visited 1 2 3 4 5 6 7 8 9 the worst beach I have ever visited

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

beach.....
codeno.....

Appendix 2

Glamorgan Heritage Coast Final Questionnaire

AGE ..... SEX.....

OCCUPATION.....

HOW FAR HAVE YOU TRAVELLED TODAY (IN MILES).....

HOW LONG DO YOU INTEND STAYING ON THE BEACH (IN HOURS).....

DID YOU KNOW THIS BEACH WAS PART OF THE HERITAGE COAST? YES NO

PLEASE CIRCLE THE NUMBER NEXT TO EACH OF THE FOLLOWING SETS OF STATEMENTS THAT BEST INDICATES THE WAY YOU FEEL ABOUT THIS PARTICULAR BEACH.

THIS BEACH IS:

too quiet	1	2	3	4	5	6	7	8	9	very noisy
too few people	1	2	3	4	5	6	7	8	9	too many
too many rock pools	1	2	3	4	5	6	7	8	9	too few rock pools
overabundance of sand	1	2	3	4	5	6	7	8	9	insufficient amount of sand
too great an expanse of sand	1	2	3	4	5	6	7	8	9	insufficient expanse of sand
sand is too soft	1	2	3	4	5	6	7	8	9	sand is very harsh
too great an expanse of grass	1	2	3	4	5	6	7	8	9	insufficient expanse of grass
tidal range too high	1	2	3	4	5	6	7	8	9	tidal range not high enough
too open/exposed/public	1	2	3	4	5	6	7	8	9	too closed/secluded/isolated
too much shelter from wind	1	2	3	4	5	6	7	8	9	too little shelter from wind
beach area is too commercialised	1	2	3	4	5	6	7	8	9	beach area is not commercialised enough
beach area has too many facilities	1	2	3	4	5	6	7	8	9	beach area does not have enough facilities

What does commercialisation mean to you?.....

,.....

,.....

THIS BEACH IS/HAS:

very attractive beach relief	1	2	3	4	5	6	7	8	9	very unattractive relief
very pleasing odours/smells	1	2	3	4	5	6	7	8	9	very unpleasant odours/smells
adequate number of toilets	1	2	3	4	5	6	7	8	9	not enough toilets
exceptionally clean toilets	1	2	3	4	5	6	7	8	9	extremely filthy toilets
adequate disabled toilet facility	1	2	3	4	5	6	7	8	9	no disabled toilet facility
excellent beach access	1	2	3	4	5	6	7	8	9	difficult/poor beach access
good disabled beach access	1	2	3	4	5	6	7	8	9	difficult/poor disabled beach access
sufficient easy access walks	1	2	3	4	5	6	7	8	9	inadequate easy access walks
walks/footpaths have very good views	1	2	3	4	5	6	7	8	9	walks/footpaths have no views
walks/footpaths are interesting	1	2	3	4	5	6	7	8	9	walks/footpaths are uninteresting
very good refreshment facilities	1	2	3	4	5	6	7	8	9	very poor refreshment facilities
excellent car parking facility	1	2	3	4	5	6	7	8	9	very poor car parking facilities
excellent seating facilities provided	1	2	3	4	5	6	7	8	9	no seating facilities provided
exceptionally clean water	1	2	3	4	5	6	7	8	9	exceptionally filthy water
water is in pristine condition	1	2	3	4	5	6	7	8	9	water is extremely poluted
excellent beach for swimming	1	2	3	4	5	6	7	8	9	appalling beach for swimming

Why?.....

,.....

,.....

exceptionally safe waters	1	2	3	4	5	6	7	8	9	exceptionally dangerous waters
exceptionally safe playing	1	2	3	4	5	6	7	8	9	exceptionally unsafe playing areas
excellent lifeguard protection	1	2	3	4	5	6	7	8	9	no lifeguard protection

Why.....

,.....

,.....

no threat of crime on the beach	1	2	3	4	5	6	7	8	9	enormous threat of crime on the beach
no litter on the beach	1	2	3	4	5	6	7	8	9	great amount of litter on the beach at all
no animal waste on the beach	1	2	3	4	5	6	7	8	9	great amount of animal waste on the beach
extensive amount/variety of wildlife	1	2	3	4	5	6	7	8	9	no wildlife present in beach area
extensive variety of plant life	1	2	3	4	5	6	7	8	9	no plant life present in beach area
no irritation from pests (flies)	1	2	3	4	5	6	7	8	9	great irritation from pests (flies etc)

WHAT, IN YOUR OPINION, IS THE BEST BEACH YOU HAVE EVER VISITED?

,.....

Why?.....
,.....
,.....

WHAT, IN YOUR OPINION, IS THE WORST BEACH YOU HAVE EVER VISITED?

,.....

Why?.....
,.....
,.....

WE WOULD LIKE TO KNOW HOW THIS BEACH COMPARES WITH THOSE WHICH YOU HAVE IDENTIFIED ABOVE.

THIS BEACH IS SIMILAR IN QUALITY TO:

the best beach I have ever visited 1 2 3 4 5 6 7 8 9 the worst beach I have ever visited

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

beach.....
codeno.....

DIRECTIONS: A number of statements which boys and girls use to describe themselves are given below. Read each statement carefully and decide how you feel *right now*. Then put an X in the box in front of the word or phrase which best describes how you feel. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, find the word or phrase which best describes how you feel right now, *at this very moment*.

1.	I feel	☐	very calm	☐	calm	☐	not calm
2.	I feel	☐	very upset	☐	upset	☐	not upset
3.	I feel	☐	very pleasant	☐	pleasant	☐	not pleasant
4.	I feel	☐	very nervous	☐	nervous	☐	not nervous
5.	I feel	☐	very jittery	☐	jittery	☐	not jittery
6.	I feel	☐	very rested	☐	rested	☐	not rested
7.	I feel	☐	very scared	☐	scared	☐	not scared
8.	I feel	☐	very relaxed	☐	relaxed	☐	not relaxed
9.	I feel	☐	very worried	☐	worried	☐	not worried
10.	I feel	☐	very satisfied	☐	satisfied	☐	not satisfied
11.	I feel	☐	very frightened	☐	frightened	☐	not frightened
12.	I feel	☐	very happy	☐	happy	☐	not happy
13.	I feel	☐	very sure	☐	sure	☐	not sure
14.	I feel	☐	very good	☐	good	☐	not good
15.	I feel	☐	very troubled	☐	troubled	☐	not troubled
16.	I feel	☐	very bothered	☐	bothered	☐	not bothered
17.	I feel	☐	very nice	☐	nice	☐	not nice
18.	I feel	☐	very terrified	☐	terrified	☐	not terrified
19.	I feel	☐	very mixed-up	☐	mixed-up	☐	not mixed-up
20.	I feel	☐	very cheerful	☐	cheerful	☐	not cheerful

DIRECTIONS: A number of statements which boys and girls use to describe themselves are given below. Read each statement carefully and decide how you feel *right now*. Then put an X in the box in front of the word or phrase which best describes how you feel. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, find the word or phrase which best describes how you feel right now, *at this very moment.*

1.	I feel	☐	very calm	☐	calm	☐	not calm
2.	I feel	☐	very upset	☐	upset	☐	not upset
3.	I feel	☐	very pleasant	☐	pleasant	☐	not pleasant
4.	I feel	☐	very nervous	☐	nervous	☐	not nervous
5.	I feel	☐	very jittery	☐	jittery	☐	not jittery
6.	I feel	☐	very rested	☐	rested	☐	not rested
7.	I feel	☐	very scared	☐	scared	☐	not scared
8.	I feel	☐	very relaxed	☐	relaxed	☐	not relaxed
9.	I feel	☐	very worned	☐	worried	☐	not worried
10.	I feel	☐	very satisfied	☐	satisfied	☐	not satisfied
11.	I feel	☐	very frightened	☐	frightened	☐	not frightened
12.	I feel	☐	very happy	☐	happy	☐	not happy
13.	I feel	☐	very sure	☐	sure	☐	not sure
14.	I feel	☐	very good	☐	good	☐	not good
15.	I feel	☐	very troubled	☐	troubled	☐	not troubled
16.	I feel	☐	very bothered	☐	bothered	☐	not bothered
17.	I feel	☐	very nice	☐	nice	☐	not nice
18.	I feel	☐	very terrified	☐	terrified	☐	not terrified
19.	I feel	☐	very mixed-up	☐	mixed-up	☐	not mixed-up
20.	I feel	☐	very cheerful	☐	cheerful	☐	not cheerful

INSTRUCTIONS Please answer each question by putting a circle around the "YES" or the "NO" following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the questions.

PLEASE REMEMBER TO ANSWER EACH QUESTION

1	Do you have many different hobbies?	YES	NO
2	Do you stop to think things over before doing anything?	YES	NO
3	Does your mood often go up and down?	YES	NO
4	Have you ever taken the praise for something you knew someone else had really done?	YES	NO
5	Are you a talkative person?	YES	NO
6	Would being in debt worry you?	YES	NO
7	Do you ever feel "just miserable" for no reason?	YES	NO
8	Were you ever greedy by helping yourself to more than your share of anything?	YES	NO
9	Do you lock up your house carefully at night?	YES	NO
10	Are you rather lively?	YES	NO
11	Would it upset you a lot to see a child or an animal suffer?	YES	NO
12	Do you often worry about things you should not have done or said?	YES	NO
13	If you say you will do something, do you always keep your promise no matter how inconvenient it might be?	YES	NO
14	Can you usually let yourself go and enjoy yourself at a lively party?	YES	NO
15	Are you an irritable person?	YES	NO
16	Have you ever blamed someone for doing something you knew was really your fault?	YES	NO
17	Do you enjoy meeting new people?	YES	NO
18	Do you believe insurance schemes are a good idea?	YES	NO
19	Are your feelings easily hurt?	YES	NO
20	Are *all* your habits good and desirable ones?	YES	NO

PLEASE TURN OVER

21	Do you tend to keep in the background on social occasions?	YES	NO
22	Would you take drugs which may have strange or dangerous effects?	YES	NO
23	Do you often feel "fed-up"?	YES	NO
24	Have you ever taken anything (even a pin or button) that belonged to someone else?	YES	NO
25	Do you like going out a lot?	YES	NO
26	Do you enjoy hurting people you love?	YES	NO
27	Are you often troubled about feelings of guilt?	YES	NO
28	Do you sometimes talk about things you know nothing about?	YES	NO
29	Do you prefer reading to meeting people?	YES	NO
30	Do you have enemies who want to harm you?	YES	NO
31	Would you call yourself a nervous person?	YES	NO
32	Do you have many friends?	YES	NO
33	Do you enjoy practical jokes that can sometimes really hurt people?	YES	NO
34	Are you a worrier?	YES	NO
35	As a child did you do as you were told immediately and without grumbling?	YES	NO
36	Would you call yourself happy-go-lucky?	YES	NO
37	Do good manners and cleanliness matter much to you?	YES	NO
38	Do you worry about awful things that might happen?	YES	NO
39	Have you ever broken or lost something belonging to someone else?	YES	NO
40	Do you usually take the initiative in making new friends?	YES	NO
41	Would you call yourself tense or "highly-strung"?	YES	NO
42	Are you mostly quiet when you are with other people?	YES	NO
43	Do you think marriage is old-fashioned and should be done away with?	YES	NO
44	Do you sometimes boast a little?	YES	NO
45	Can you easily get some life into a rather dull party?	YES	NO
46	Do people who drive carefully annoy you?	YES	NO
47	Do you worry about your health?	YES	NO
48	Have you ever said anything bad or nasty about anyone?	YES	NO
49	Do you like telling jokes and funny stories to your friends?	YES	NO
50	Do most things taste the same to you?	YES	NO
51	As a child were you ever cheeky to your parents?	YES	NO
52	Do you like mixing with people?	YES	NO
53	Does it worry you if you know there are mistakes in your work?	YES	NO
54	Do you suffer from sleeplessness?	YES	NO

55	Do you always wash before a meal?	YES	NO
56	Do you nearly always have a "ready answer" when people talk to you?	YES	NO
57	Do you like to arrive at appointments in plenty of time?	YES	NO
58	Have you often felt listless and tired for no reason?	YES	NO
59	Have you ever cheated at a game?	YES	NO
60	Do you like doing things in which you have to act quickly?	YES	NO
61	Is (or was) your mother a good woman?	YES	NO
62	Do you often feel life is very dull?	YES	NO
63	Have you ever taken advantage of someone?	YES	NO
64	Do you often take on more activities than you have time for?	YES	NO
65	Are there several people who keep trying to avoid you?	YES	NO
66	Do you worry a lot about your looks?	YES	NO
67	Do you think people spend too much time safeguarding their future with savings and insurances?	YES	NO
68	Have you ever wished that you were dead?	YES	NO
69	Would you dodge paying taxes if you were sure you could never be found out?	YES	NO
70	Can you get a party going?	YES	NO
71	Do you try not to be rude to people?	YES	NO
72	Do you worry too long after an embarrassing experience?	YES	NO
73	Have you ever insisted on having your own way?	YES	NO
74	When you catch a train do you often arrive at the last minute?	YES	NO
75	Do you suffer from "nerves"?	YES	NO
76	Do your friendships break up easily without it being your fault?	YES	NO
77	Do you often feel lonely?	YES	NO
78	Do you always practice what you preach?	YES	NO
79	Do you sometimes like teasing animals?	YES	NO
80	Are you easily hurt when people find fault with you or the work you do?	YES	NO
81	Have you ever been late for an appointment or work?	YES	NO
82	Do you like plenty of bustle and excitement around you?	YES	NO
83	Would you like other people to be afraid of you?	YES	NO
84	Are you sometimes bubbling over with energy and sometimes very sluggish?	YES	NO
85	Do you sometimes put off until tomorrow what you ought to do today?	YES	NO
86	Do other people think of you as being very lively?	YES	NO
87	Do people tell you a lot of lies?	YES	NO
88	Are you touchy about some things?	YES	NO
89	Are you always willing to admit it when you have made a mistake?	YES	NO
90	Would you feel very sorry for an animal caught in a trap?	YES	NO

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS

page

Appendix 3

Summary of 1991 Bathing Water Results for Southerndown (NRA, 1991)

Compliance of Southerndown Beach with "I" values for E. coli and Total Coliforms

	No. Samples	No. Fail	Pass/Fail	Range (No. /100 ml)
E. coli	22	0	Pass	15 - 1900
Total coliforms	22	0	Pass	50 - 8800

Overall Result: Pass

Results at Southerndown Beach for Salmonella and Enterovirus

	No. Samples	No. Positive Results
Salmonella	5	0
Enterovirus	2	0

Results at Southerndown Beach for Faecal Streptococci

	No. Samples	No. Samples >100/100 ml
Faecal Streptococci	22	6

Range of Faecal Streptococci (No./100 ml): <5 - 945

Appendix 4

Summary of 1991 Bathing Water Results for Llantwit and Ogmore

(NRA, 1991)

Analysis of Bathing waters at Llantwit and Ogmore for E. coli and Total Coliforms

	E. coli		Total coliforms	
	No. Samples	No. with >2000/100 ml	No. Samples	No. with >2000/100 m
Llantwit	27	3	27	1
Ogmore	22	2	22	2

Results at Llantwit and Ogmore for Faecal Streptococci

	No. Samples	No. with >100/100 ml
Llantwit	27	9
Ogmore	22	7

Ranges of E. coli, Total coliforms and Faecal Streptococci at Llantwit and Ogmore (No./100 ml)

	E. coli	Total coliforms	Faecal Streptococci
Llantwit	30 - 8000	100 - 16000	4 - 5500
Ogmore	<100 - 9000	200 - 13500	8 - 2660

Appendix 5

Main Study - 1st Draft of Questionnaire

This questionnaire is designed to find out what people like and dislike about different aspects of beaches and what things they think are most important at the beach.

PART 1

Please indicate your preferences for beach features by putting '1' in the box after the feature you would most like, then '2', '3' and so on in the other boxes.

EXAMPLE: FOR QUESTION 3, 'I'd like the beach to be made of:', IF YOU LIKE A BEACH OF *SAND* THE BEST, FOLLOWED BY A BEACH OF *GRAVEL*, THEN A BEACH OF *STONES BIGGER THAN A GOLF BALL* AND WOULD LIKE A BEACH MADE OF *MUD* THE LEAST, YOU WOULD PUT:

stones bigger than a golf ball [3] gravel [2] sand [1] mud [4]

Please turn over

SECTION A

1. I'd like the beach to be made of:
   stones bigger than a golf ball ☐ gravel ☐ sand ☐ mud ☐

2. I would like sand to be: hard ☐ soft ☐

3. I'd like colour of the sand to be:
   grey ☐ black ☐ brown ☐ tan ☐ white ☐

4. I'd like the sea temperature to be:
   Cold (less than 50°F) ☐ cool (50 to 60°F) ☐ neither cold nor warm (60 to 70°F) ☐
   warm (70 to 80°F) ☐ hot (80 to 90°F) ☐ very hot (over 90°F) ☐

5. On the beach in a swimming costume I'd like to feel:
   cold ☐ cool ☐ neither cold nor warm ☐ warm ☐ hot ☐ very hot ☐

6. I'd like the beach to be:
   very exposed ☐ sheltered but with some breeze ☐ sheltered from all breezes ☐

7. I'd like the beach to have:
   patchy sand with rocks sticking up ☐ smooth, flat rock ☐ lots of sand ☐

Please turn over

SECTION B

1. On the sea I'd like to see waves:
over 6 feet high ☐ 3 to 6 feet high ☐ 1 to 3 feet high ☐ 4 inches to 1 foot high ☐ under 4 inches high ☐

2. I'd like the beach to be: flat ☐ gently sloping ☐ steeply sloping ☐

3. If I walk 10 yards into the sea, I'd like the water to be (for an adult):
up to my neck ☐ up to my waist ☐ up to my knees ☐ at my ankles ☐

4. I'd like the beach:
to have a wide, signposted road to it ☐ to have signs telling people the way to it, but not a large road ☐
to be down a narrow road without signs ☐

5. To get onto the beach, I'd like:
a road to walk on ☐ a level path ☐ a rough path ☐ no path at all ☐

6. I'd like the beach to have:
a large car park within 200 yards of the beach ☐ a car park over 200 yards away (but within ½ mile) ☐
no car park within ½ mile ☐

7. At the beach, I'd like watersports like water-skiing, jet-skiing and windsurfing:
to be allowed anywhere ☐ only allowed in one area ☐
to be banned ☐

Please turn over

SECTION C

1. At the beach, I'd like:
   cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

2. I'd like: a bar serving alcohol and soft drinks at the beach ☐ no alcohol served ☐

3. I would like the width of the beach when the sea is out (low tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

4. I would like the width of the beach when the sea is in (high tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

5. I'd like:
   vehicles to be allowed to drive on the beach ☐ just ice-cream vans allowed to drive onto the beach ☐
   no vehicles to be allowed on the beach ☐

6. I'd like dogs:
   to be allowed anywhere on the beach ☐ allowed in one area ☐ banned from the beach ☐

7. Right behind the beach I'd like to see:
   towering cliffs or mountains (over 500 feet high) ☐ very high cliffs or mountains (200 to 500 feet high) ☐
   quite high cliffs or hills (60 to 200 feet high) ☐ low cliffs (30 to 60 feet high) ☐
   no cliffs or hills ☐

Please turn over

PART 2

PLEASE TELL US HOW IMPORTANT YOU THINK DIFFERENT ASPECTS OF THE BEACH ARE BY CIRCLING A NUMBER BETWEEN 1 AND 5 AFTER EACH STATEMENT.

SECTION A

		very important				not important
1	The right temperature for a day at the beach is:	1	2	3	4	5
2	Sunny weather is:	1	2	3	4	5
3	Dry weather is:	1	2	3	4	5
4	Whether the wind is not too strong is:	1	2	3	4	5
5	Whether bathing water is clean is:	1	2	3	4	5
6	The amount of pollution in the sea is:	1	2	3	4	5
7	Whether there are sticks, leaves and rubbish floating in the sea is:	1	2	3	4	5
8	The amount of litter on the beach is:	1	2	3	4	5
9	Absence of oil from the beach is:	1	2	3	4	5
10	Whether there are strong currents in the sea is:	1	2	3	4	5
11	Whether the tides may be hazardous is:	1	2	3	4	5
12	Whether waves be a hazard to bathers is:	1	2	3	4	5
13	Whether there are lifeguards at the beach is:	1	2	3	4	5
14	Whether or not there are harmful animals (such as jellyfish and sharks) in the water is:	1	2	3	4	5
15	Whether there are sharp rocks or pits in the water is:	1	2	3	4	5
16	Whether there may be a danger from falling rocks is:	1	2	3	4	5
17	Whether there is seaweed on the beach is:	1	2	3	4	5

Please turn over

SECTION B

		very important				not important
1	Whether factories and industry are visible from the beach is:	1	2	3	4	5
2	Whether pylons and power lines are visible is:	1	2	3	4	5
3	Whether there is a concrete seawall behind the beach is:	1	2	3	4	5
4	Whether there is a smell of cooking food is:	1	2	3	4	5
5	Whether one can detect smells from factories is:	1	2	3	4	5
6	Whether there are traffic fumes is:	1	2	3	4	5
7	Whether there is a smell of seaweed or fishy smells is :	1	2	3	4	5
8	The level of noise from roads and railways is:	1	2	3	4	5
9	The level of noise from factories is:	1	2	3	4	5
10	The presence of rock pools with fish, plants and animals is:	1	2	3	4	5
11	Whether there are public toilets at the beach is:	1	2	3	4	5
12	Whether the toilets are clean is:	1	2	3	4	5
13	Being able to take a shower in the toilet blocks is:	1	2	3	4	5
14	Whether there are sewage pipes crossing the beach is:	1	2	3	4	5
15	Whether there are concrete ramps and piers visible or close to the beach is:	1	2	3	4	5
16	What the beach is made of (sand or stones) is:	1	2	3	4	5
17	The colour of the sand is:	1	2	3	4	5
18	Whether there are insects and flies on the beach is:	1	2	3	4	5
19	Whether there is water for washing and drinking is:	1	2	3	4	5
20	Whether one can hire sunbeds and chairs is:	1	2	3	4	5

Please turn over

SECTION C

		very important				not important
1	Having bathing water at the right temperature is:	1	2	3	4	5
2	Whether the beach is sheltered or open is:	1	2	3	4	5
3	Whether there is sand or rock on the beach is:	1	2	3	4	5
4	Whether the sea is calm or has big waves is:	1	2	3	4	5
5	The slope of the beach above the water is:	1	2	3	4	5
6	How quickly the water gets deep when wading in is:	1	2	3	4	5
7	Whether the beach has signs showing the way to it is:	1	2	3	4	5
8	Whether a car park is close to the beach is:	1	2	3	4	5
9	Whether water sports are allowed in the sea is:	1	2	3	4	5
10	The level of refreshment facilities is:	1	2	3	4	5
11	Whether alcohol is served at the beach is:	1	2	3	4	5
12	How far it is to the sea when the sea is out (low tide) is:	1	2	3	4	5
13	How far it is to the sea when the sea is in (high tide) is:	1	2	3	4	5
14	How easy it is to get onto the beach (on a road or path) is:	1	2	3	4	5
15	Whether vehicles are allowed on the beach is:	1	2	3	4	5
16	Whether or not dogs are allowed on the beach is:	1	2	3	4	5
17	Whether or not here are cliffs or mountains right behind the beach is:	1	2	3	4	5

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

Appendix 6

Main Study - 2nd Draft of Questionnaire

This questionnaire is designed to find out what people like and dislike about different aspects of beaches and what things they think are most important at the beach.

PART 1

Please indicate your preferences for beach features by putting '1' in the box after the feature you would most like, then '2', '3' and so on in the other boxes.

EXAMPLE: FOR QUESTION 3, 'I'd like the beach to be made of:';

IF YOU LIKE A BEACH OF ***SAND*** THE BEST,

FOLLOWED BY A BEACH OF ***GRAVEL***,

THEN A BEACH OF ***STONES BIGGER THAN A GOLF BALL***

AND WOULD LIKE A BEACH MADE OF ***MUD*** THE LEAST,

YOU WOULD PUT:

stones bigger than a golf ball [3] gravel [2] sand [1] mud [4]

Now try this one yourself

Suppose you would prefer a beach with just basic refreshments, but would definitely avoid one with no refreshments at all. Try filling in the boxes below.

At the beach, I'd like:

cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

You should have put:

cafes with a wide selection of food [2] just basic refreshments [1] no cafes or kiosks [3]

Please turn over

SECTION A

1. I'd like the beach to be made of:
   stones bigger than a golf ball ☐ gravel ☐ sand ☐ mud ☐

2. I would like sand to be: hard ☐ soft ☐

3. I'd like colour of the sand to be:
   grey ☐ black ☐ brown ☐ tan ☐ white ☐

4. I'd like the sea temperature to be:
   Cold (less than 50°F) ☐ cool (50 to 60°F) ☐ neither cold nor warm (60 to 70°F) ☐
   warm (70 to 80°F) ☐ hot (80 to 90°F) ☐ very hot (over 90°F) ☐

5. On the beach in a swimming costume I'd like to feel:
   cold ☐ cool ☐ neither cold nor warm ☐ warm ☐ hot ☐ very hot ☐

6. I'd like the beach to be:
   very exposed ☐ sheltered but with some breeze ☐ sheltered from all breezes ☐

7. I'd like the beach to have:
   patchy sand with rocks sticking up ☐ smooth, flat rock ☐ lots of sand ☐

Please turn over

SECTION B

1. On the sea I'd like to see waves:
over 6 feet high ☐ 3 to 6 feet high ☐ 1 to 3 feet high ☐ 4 inches to 1 foot high ☐ under 4 inches high ☐

2. I'd like the beach to be: flat ☐ gently sloping ☐ steeply sloping ☐

3. If I walk 10 yards into the sea, I'd like the water to be (for an adult):
up to my neck ☐ up to my waist ☐ up to my knees ☐ at my ankles ☐

4. I'd like the beach:
to have a wide, signposted road to it ☐ to have signs telling people the way to it, but not a large road ☐
to be down a narrow road without signs ☐

5. To get onto the beach, I'd like:
a road to walk on ☐ a level path ☐ a rough path ☐ no path at all ☐

6. I'd like the beach to have:
a large car park within 200 yards of the beach ☐ a car park over 200 yards away (but within ½ mile) ☐
no car park within ½ mile ☐

7. At the beach, I'd like watersports like water-skiing, jet-skiing and windsurfing:
to be allowed anywhere ☐ only allowed in one area ☐
to be banned ☐

Please turn over

SECTION C

1. At the beach, I'd like:
   cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

2. I'd like: a bar serving alcohol and soft drinks at the beach ☐ no alcohol served ☐

3. I would like the width of the beach when the sea is out (low tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

4. I would like the width of the beach when the sea is in (high tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

5. I'd like:
   vehicles to be allowed to drive on the beach ☐ just ice-cream vans allowed to drive onto the beach ☐
   no vehicles to be allowed on the beach ☐

6. I'd like dogs:
   to be allowed anywhere on the beach ☐ allowed in one area ☐ banned from the beach ☐

7. Right behind the beach I'd like to see:
   towering cliffs or mountains (over 500 feet high) ☐ very high cliffs or mountains (200 to 500 feet high) ☐
   quite high cliffs or hills (60 to 200 feet high) ☐ low cliffs (30 to 60 feet high) ☐
   no cliffs or hills ☐

Please turn over

PART 2

WE WOULD LIKE TO KNOW HOW IMPORTANT YOU THINK DIFFERENT ASPECTS OF THE BEACH ARE. YOU CAN DO THIS BY CIRCLING A NUMBER BETWEEN 1 AND 5 IN EACH ROW.

SECTION A

Circle just one number in each row

	very important				not important	
The temperature at the beach must be pleasant	1	2	3	4	5	The temperature at the beach is not important
The weather must be sunny	1	2	3	4	5	It does not matter if the sun is not shining
The weather must be dry	1	2	3	4	5	I don't mind if the weather is dry or not
The wind must feel pleasant	1	2	3	4	5	I don't mind if it is too windy or still
Bathing water must be clean	1	2	3	4	5	Cleanliness of bathing water does not matter to me
The sea must be free of pollution	1	2	3	4	5	Pollution in the sea does not matter to me
There must be no leaves and litter floating in the sea	1	2	3	4	5	Floating leaves and litter do not matter to me
The beach must be free of litter	1	2	3	4	5	Litter on the beach does not matter to me
There must be no oil on the beach	1	2	3	4	5	Oil on the beach does not matter to me
There must not be strong currents in the sea	1	2	3	4	5	Strong currents in the sea do not matter to me
There must not be hazardous tides	1	2	3	4	5	I don't mind if there are hazardous tides
There must not be large waves which might endanger bathers	1	2	3	4	5	I don't mind if there are large waves
There must be lifeguards at the beach	1	2	3	4	5	I don't mind if there are no lifeguards
There must not be harmful animals (jellyfish or sharks) in the water	1	2	3	4	5	I don't mind if there may be dangerous animals in the water
The shore must be free from sharp rocks and pits	1	2	3	4	5	I don't mind if there are sharp rocks or pits
There must be no danger from falling rocks on the beach	1	2	3	4	5	I don't mind if there might be danger from falling rocks
The beach must be free from seaweed	1	2	3	4	5	Seaweed on the beach does not matter to me

Please turn over

SECTION B

Circle just one number in each row

	very important					not important	
Factories must not be visible from the beach	1	2	3	4	5	I don't mind if factories are visible
Pylons and power lines must not be visible from the beach	1	2	3	4	5	I don't mind if pylons and power lines are visible
There must not be a concrete seawall at the back of the beach	1	2	3	4	5	I don't mind if there is a seawall at the back of the beach
I must not be able to smell cooking food on the beach	1	2	3	4	5	The small of food being cooked does not matter to me
I must not be able to detect smells from factories when on the beach	1	2	3	4	5	I don't mind smells from factories
There must be no traffic fumes detectable on the beach	1	2	3	4	5	I don't mind if I can smell traffic fumes on the beach
There must be no smells of seaweed or fishy smells	1	2	3	4	5	It does not matter if there are smells of seaweed or fishy smells
There must be no noise from roads and railways when on the beach	1	2	3	4	5	I don't mind if I cah hear noise from roads and railways
There must be no noise from factories when on the beach	1	2	3	4	5	I don't mind if I can hear noise from factories
There must be rock pools at the beach with fish, plants and animals	1	2	3	4	5	It does not matter if there are no rock pools at the beach
There must be public toilets at the beach	1	2	3	4	5	I don't mind if there are no toilets at the beach
The toilets must be clean	1	2	3	4	5	I don't care whether the toilets are clean or dirty
I must be able to take a shower when on the beach	1	2	3	4	5	I don't mind if there are no showers at the beach
There must be no sewage pipes crossing the beach	1	2	3	4	5	I don't mind if there are sewage pipes crossing the beach
There must be no concrete ramps and piers close to the beach	1	2	3	4	5	I don't mind if there are ramps or piers close to the beach
The beach must have plenty of sand	1	2	3	4	5	I don't mind if there is little or no sand at the beach
The sand must be a pleasant colour	1	2	3	4	5	The colour of the sand does not matter to me
The beach must be free from insects and flies	1	2	3	4	5	I don't mind if there may be insects or flies present
There must be fresh water for washing and drinking	1	2	3	4	5	I don't mind if fresh water is not available
I must be able to hire sunbeds and chairs	1	2	3	4	5	I don't mind if sunbeds and chairs are not available

Please turn over

SECTION C

Circle just one number in each row

very important						not important
Bathing water must be at the right temperature for me	1	2	3	4	5	The water temperature does not matter to me
The beach must have the amount of shelter I like	1	2	3	4	5	I don't mind whether or not it is sheltered
Whether the sea is calm or has big waves is important	1	2	3	4	5	Whether the sea is calm or has big waves does not matter
Whether the beach is level or slopes down to the water is important	1	2	3	4	5	I don't mind whether the beach is level or slopes down to the water
Whether the water in the sea gets deep quickly or slowly, when wading in is important	1	2	3	4	5	I don't mind whether the sea gets deep quickly or slowly when wading in
Whether the beach has signs showing the way to it, or is not signposted is important	1	2	3	4	5	I don't mind whether or not the beach is signposted
Whether car parks are close to the beach, or far away is important	1	2	3	4	5	I don't mind whether car parks are close by or far away
Whether water sports are allowed in the sea, or banned is important	1	2	3	4	5	I don't mind whether water sports are banned or allowed at the beach
The level of refreshment facilities must be right for me	1	2	3	4	5	I don't mind about the level of refreshment facilities
Whether alcohol is or is not served at the beach is important	1	2	3	4	5	I don't mind whether alcohol is or is not served at the beach
The distance to the sea when the sea is out (low tide) is important	1	2	3	4	5	The distance to the sea at low tide does not matter
The distance to the sea when the sea is in (high tide) is important	1	2	3	4	5	The distance to the sea at high tide does not matter
How easy or difficult it is for people to get onto the beach (on a road or path) is important	1	2	3	4	5	How easy or difficult it is for people to get onto the beach does not matter
Whether vehicles are allowed on, or banned from the beach is important	1	2	3	4	5	Whether vehicles are allowed on the beach or banned, does not matter
Whether dogs are allowed on, or banned from the beach is important	1	2	3	4	5	Whether dogs are allowed on the beach or banned, does not matter

Please turn over

Which type of beach do you PREFER to visit?

Finally, please tell me which type of beach you *prefer* to visit by ticking *one* of the boxes opposite the descriptions below.

I prefer to visit,

Tick **one** box only

a) An undeveloped beach with no facilities for visitors at all ☐

b) A beach with a few facilities: just a toilet, small refreshment kiosk and car park ☐

c) A beach at a small resort with toilets, cafe selling meals, drinks, ice-creams, etc, a lifeguard at busy weekends and large car park ☐

d) A beach at a medium sized resort with several cafes, one or more restaurants, fast food outlets, some other shops, washrooms with showers and car parks. ☐

e) A beach at a large, highly developed resort with many cafes, restaurants, shops, amusements, etc. ☐

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

Appendix 7

Main Study - 3rd Draft of Questionnaire

This questionnaire is designed to find out what people like and dislike about different aspects of beaches and what things they think are most important at the beach.

PART 1

Please indicate your preferences for beach features by putting '1' in the box after the feature you would most like, then '2', '3' and so on in the other boxes.

EXAMPLE: FOR QUESTION 3, 'I'd like the beach to be made of:';

IF YOU LIKED A BEACH OF *SAND* THE BEST,

FOLLOWED BY A BEACH OF *GRAVEL*,

THEN A BEACH OF *STONES BIGGER THAN A GOLF BALL*

AND LIKED A BEACH MADE OF *MUD* THE LEAST,

YOU WOULD PUT:

stones bigger than a golf ball [3] gravel [2] sand [1] mud [4]

299

Now try this one yourself

Suppose you preferred a beach with just basic refreshments, but would definitely avoid one with no refreshments at all.
Try filling in the boxes below.

At the beach, I'd like:

cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

You could have put:
cafes with a wide selection of food [2] just basic refreshments [1] no cafes or kiosks [3]

Please turn over

SECTION A

1. I'd like the beach to be made of:
   stones bigger than a golf ball ☐ gravel ☐ sand ☐ mud ☐

2. I would like sand to be: hard ☐ soft ☐

3. I'd like colour of the sand to be:
   grey ☐ black ☐ brown ☐ tan ☐ white ☐

300

4. I'd like the sea temperature to be:
   Cold (less than 50°F) ☐ cool (50 to 60°F) ☐ neither cold nor warm (60 to 70°F) ☐
   warm (70 to 80°F) ☐ hot (80 to 90°F) ☐ very hot (over 90°F) ☐

5. On the beach in a swimming costume I'd like to feel:
   cold ☐ cool ☐ neither cold nor warm ☐ warm ☐ hot ☐ very hot ☐

6. I'd like the beach to be:
   very exposed ☐ sheltered but with some breeze ☐ sheltered from all breezes ☐

7. I'd like the beach to have:
   patchy sand with rocks sticking up ☐ smooth, flat rock ☐ lots of sand ☐

Please turn over

SECTION B

1. On the sea I'd like to see waves:
over 6 feet high ☐ 3 to 6 feet high ☐ 1 to 3 feet high ☐ 4 inches to 1 foot high ☐ under 4 inches high ☐

2. I'd like the beach to be: flat ☐ gently sloping ☐ steeply sloping ☐

3. If I walk 10 yards into the sea, I'd like the water to be (for an adult):
up to my neck ☐ up to my waist ☐ up to my knees ☐ at my ankles ☐

4. I'd like the beach:
to have a wide, signposted road to it ☐ to have signs telling people the way to it, but not a large road ☐
to be down a narrow road without signs ☐

5. To get onto the beach, I'd like:
a road to walk on ☐ a level path ☐ a rough path ☐ no path at all ☐

6. I'd like the beach to have:
a large car park within 200 yards of the beach ☐ a car park over 200 yards away (but within ½ mile) ☐
no car park within ½ mile ☐

7. At the beach, I'd like watersports like water-skiing, jet-skiing and windsurfing:
to be allowed anywhere ☐ only allowed in one area ☐
to be banned ☐

Please turn over

SECTION C

1. At the beach, I'd like:
   cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

2. I'd like: a bar serving alcohol and soft drinks at the beach ☐ no alcohol served ☐

3. I would like the width of the beach when the sea is out (low tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

4. I would like the width of the beach when the sea is in (high tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

5. I'd like:
   vehicles to be allowed to drive on the beach ☐ just ice-cream vans allowed to drive onto the beach ☐
   no vehicles to be allowed on the beach ☐

6. I'd like dogs:
   to be allowed anywhere on the beach ☐ allowed in one area ☐ banned from the beach ☐

Please turn over

PART 2

CIRCLE A NUMBER BETWEEN 1 AND 5 IN EACH ROW TO SHOW HOW MUCH YOU AGREE/DISAGREE WITH THE STATEMENTS AT EACH END.

SECTION A

Circle just one number in each row

The water temperature does not matter to me	1	2	3	4	5	It is essential that the bathing water is at the right temperature for me
I don't mind whether or not the beach is sheltered	1	2	3	4	5	The beach must always have the amount of shelter I like
Whether the sea is calm or has big waves does not matter	1	2	3	4	5	Whether the sea is calm or has big waves is extremely important
I don't mind whether the beach is level or slopes down to the water	1	2	3	4	5	Whether the beach is level or slopes down to the water is extremely important
I don't mind whether the water gets deep quickly or slowly when wading in	1	2	3	4	5	How quickly the water gets deep when wading in is extremely important
I don't mind whether or not the beach is signposted	1	2	3	4	5	Whether the beach has signs showing the way to it, or is not signposted is extremely important
I don't mind whether car parks are close by or far away	1	2	3	4	5	Whether car parks are close to the beach, or far away is extremely important
I don't mind whether water sports are banned or allowed at the beach	1	2	3	4	5	Whether water sports are allowed in the sea, or banned is extremely important
I don't mind about the level of refreshment facilities	1	2	3	4	5	The level of refreshment facilities must be exactly right for me
I don't mind whether alcohol is or is not served at the beach	1	2	3	4	5	Whether alcohol is or is not served at the beach is extremely important
The distance to the sea at low tide does not matter	1	2	3	4	5	The distance to the sea when the sea is out (low tide) is extremely important
The distance to the sea at high tide does not matter	1	2	3	4	5	The distance to the sea when the sea is in (high tide) is extremely important
How easy or difficult it is for people to get onto the beach does not matter	1	2	3	4	5	How easy or difficult it is for people to get onto the beach (on a road or path) is extremely important
Whether vehicles are allowed on the beach or banned, does not matter	I	2	3	4	5	Whether vehicles are allowed on, or banned from the beach is extremely important
Whether dogs are allowed on the beach or banned, does not matter	1	2	3	4	5	Whether dogs are allowed on, or banned from the beach is extremely important

Please turn over

SECTION B

Circle just one number in each row

The smell of food being cooked does not matter to me	1	2	3	4	5	I must never be able to smell cooking food on the beach
I don't mind smells from factories	1	2	3	4	5	I must never be able to detect smells from factories when on the beach
I don't mind if I can smell traffic fumes on the beach	1	2	3	4	5	There must never be no traffic fumes detectable on the beach
It does not matter if there are smells of seaweed or fishy smells	1	2	3	4	5	There must never be no smells of seaweed or fishy smells
I don't mind if I can hear noise from roads and railways	1	2	3	4	5	There must never be any noise from roads and railways when on the beach
I don't mind if I can hear noise from factories	1	2	3	4	5	There must never be any noise from factories when on the beach
It does not matter if there are no rock pools at the beach	1	2	3	4	5	It is essential there are rock pools at the beach with fish, plants and animals
I don't mind if there are no toilets at the beach	1	2	3	4	5	Public toilets are essential at the beach
I don't care whether the toilets are clean or dirty	1	2	3	4	5	It is essential that the toilets must be clean
I don't mind if there are no showers at the beach	1	2	3	4	5	I must always be able to take a shower when on the beach
I don't mind if there is little or no sand at the beach	1	2	3	4	5	It is essential that the beach has plenty of sand
The colour of the sand does not matter to me	1	2	3	4	5	It is essential that the sand has a pleasant colour
I don't mind if there may be insects or flies present	1	2	3	4	5	There must never be insects or flies present at the beach
I don't mind if fresh water is not available	1	2	3	4	5	There must always be fresh water for washing and drinking available
I don't mind if sunbeds and chairs are not available	1	2	3	4	5	It is essential that I can hire sunbeds and chairs

SECTION C

Circle just one number in each row

The temperature at the beach is not important	1	2	3	4	5	It is essential that the temperature at the beach is pleasant
It does not matter if the sun is not shining	1	2	3	4	5	It is essential that the weather is sunny
I don't mind if the weather is dry or not	1	2	3	4	5	It is essential that the weather must be dry
I don't mind if it is too windy or still	1	2	3	4	5	It is essential that the wind is pleasant
Cleanliness of bathing water does not matter to me	1	2	3	4	5	It is essential that the bathing water is clean
Pollution in the sea does not matter to me	1	2	3	4	5	It is imperative that the sea is free of pollution
Floating leaves and litter do not matter to me	1	2	3	4	5	It is essential that no leaves or litter are floating in the sea
Litter on the beach does not matter to me	1	2	3	4	5	It is imperative that the beach is free of litter
Oil on the beach does not matter to me	1	2	3	4	5	It is essential that there is no oil on the beach
Strong currents in the sea do not matter to me	1	2	3	4	5	It is essential that there are no strong currents in the sea
I don't mind if there are hazardous tides	1	2	3	4	5	There must neverbe hazardous tides
I don't mind if there are large waves	1	2	3	4	5	There must never be large waves which might endanger bathers
I don't mind if there are no lifeguards	1	2	3	4	5	It is imperative that there are lifeguards at the beach
I don't mind if there may be dangerous animals in the water	1	2	3	4	5	Harmful animals (jellyfish or sharks) must never be present in the water
I don't mind if there are sharp rocks or pits	1	2	3	4	5	It is essential that the shore is free from sharp rocks and pits
I don't mind if there might be danger from falling rocks	1	2	3	4	5	There must never be any danger from falling rocks on the beach
Seaweed on the beach does not matter to me	1	2	3	4	5	It is essential that the shore is free from seaweed

Please turn over

PART 3

Please put the following aspects of a beach in order of their importance to you (1 for the most important, then 2, then 3, etc.).

	Put a number in each box
Good facilities	☐
Clean sand and water	☐
Attractive views and landscape	☐
Safe bathing and swimming	☐
Good access and parking	☐

306

XXXX

Appendix 8

Main Study - 4th Draft of Questionnaire

This questionnaire is designed to find out what people like and dislike about different aspects of beaches and what things they think are most important at the beach.

PART 1

Please indicate your preferences for beach features by putting '1' in the box after the feature you would most like, then '2', '3' and so on in the other boxes.

EXAMPLE: FOR QUESTION 3, 'I'd like the beach to be made of:';

IF YOU LIKED A BEACH OF ***SAND*** THE BEST,

FOLLOWED BY A BEACH OF ***GRAVEL***,

THEN A BEACH OF ***STONES BIGGER THAN A GOLF BALL***

AND LIKED A BEACH MADE OF ***MUD*** THE LEAST,

YOU COULD PUT:

stones bigger than a golf ball [3] gravel [2] sand [1] mud [4]

Now try this one yourself

Suppose you preferred a beach with just basic refreshments, but would definitely avoid one with no refreshments at all. Try filling in the boxes below.

At the beach, I'd like:

cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

You could have put:
cafes with a wide selection of food [2] just basic refreshments [1] no cafes or kiosks [3]

Please turn over

SECTION A

1. I'd like the beach to be made of:
   stones bigger than a golf ball ☐ gravel ☐ sand ☐ mud ☐

2. I would like sand to be: hard ☐ soft ☐

3. I'd like colour of the sand to be:
   grey ☐ black ☐ brown ☐ tan ☐ white ☐

4. I'd like the sea temperature to be:
   Cold (less than 50°F) ☐ cool (50 to 60°F) ☐ neither cold nor warm (60 to 70°F) ☐
   warm (70 to 80°F) ☐ hot (80 to 90°F) ☐ very hot (over 90°F) ☐

5. On the beach in a swimming costume I'd like to feel:
   cold ☐ cool ☐ neither cold nor warm ☐ warm ☐ hot ☐ very hot ☐

6. I'd like the beach to be:
   very exposed ☐ sheltered but with some breeze ☐ sheltered from all breezes ☐

7. I'd like the beach to have:
   patchy sand with rocks sticking up ☐ smooth, flat rock ☐ lots of sand ☐

Please turn over

SECTION B

1. On the sea I'd like to see waves:
over 6 feet high ☐ 3 to 6 feet high ☐ 1 to 3 feet high ☐ 4 inches to 1 foot high ☐ under 4 inches high ☐

2. I'd like the beach to be: flat ☐ gently sloping ☐ steeply sloping ☐

3. If I walk 10 yards into the sea, I'd like the water to be (for an adult):
up to my neck ☐ up to my waist ☐ up to my knees ☐ at my ankles ☐

4. I'd like the beach:
to have a wide, signposted road to it ☐ to have signs telling people the way to it, but not a large road ☐
to be down a narrow road without signs ☐

5. To get onto the beach, I'd like:
a road to walk on ☐ a level path ☐ a rough path ☐ no path at all ☐

6. I'd like the beach to have:
a large car park within 200 yards of the beach ☐ a car park over 200 yards away (but within ½ mile) ☐
no car park within ½ mile ☐

7. At the beach, I'd like watersports like water-skiing, jet-skiing and windsurfing:
to be allowed anywhere ☐ only allowed in one area ☐
to be banned ☐

Please turn over

SECTION C

1. At the beach, I'd like:
   cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

2. I'd like: a bar serving alcohol and soft drinks at the beach ☐ no alcohol served ☐

3. I would like the width of the beach when the sea is out (low tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

4. I would like the width of the beach when the sea is in (high tide) to be:
   less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
   between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

5. I'd like:
   vehicles to be allowed to drive on the beach ☐ just ice-cream vans allowed to drive onto the beach ☐
   no vehicles to be allowed on the beach ☐

6. I'd like dogs:
   to be allowed anywhere on the beach ☐ allowed in one area ☐ banned from the beach ☐

Please turn over

PART 2

CIRCLE A NUMBER BETWEEN 1 AND 5 IN EACH ROW TO SHOW HOW MUCH YOU AGREE/DISAGREE WITH THE STATEMENTS AT EACH END.

SECTION A

Circle just one number in each row

The water temperature does not matter to me	1	2	3	4	5	It is essential that the bathing water is at the right temperature for me
I don't mind whether or not the beach is sheltered	1	2	3	4	5	The beach must always have the amount of shelter I like
Whether the sea is calm or has big waves is extremely important	1	2	3	4	5	Whether the sea is calm or has big waves does not matter
Whether the beach is level or slopes down to the water is extremely important	1	2	3	4	5	I don't mind whether the beach is level or slopes down to the water
I don't mind whether the water gets deep quickly or slowly when wading in	1	2	3	4	5	How quickly the water gets deep when wading in is extremely important
Whether the beach has signs showing the way to it, or is not signposted is extremely important	1	2	3	4	5	I don't mind whether or not the beach is signposted
I don't mind whether car parks are close by or far away	1	2	3	4	5	Whether car parks are close to the beach, or far away is extremely important
Whether water sports are allowed in the sea, or banned is extremely important	1	2	3	4	5	I don't mind whether water sports are banned or allowed at the beach
The level of refreshment facilities must be exactly right for me	1	2	3	4	5	I don't mind about the level of refreshment facilities
I don't mind whether alcohol is or is not served at the beach	1	2	3	4	5	Whether alcohol is or is not served at the beach is extremely important
The distance to the sea at low tide does not matter	1	2	3	4	5	The distance to the sea when the sea is out (low tide) is extremely important
The distance to the sea when the sea is in (high tide) is extremely important	1	2	3	4	5	The distance to the sea at high tide does not matter
How easy or difficult it is for people to get onto the beach does not matter	1	2	3	4	5	How easy or difficult it is to get onto the beach (on a road or path) is extremely important
Whether vehicles are allowed on the beach or banned, does not matter	1	2	3	4	5	Whether vehicles are allowed on, or banned from the beach is extremely important
Whether dogs are allowed on, or banned from the beach is extremely important	1	2	3	4	5	Whether dogs are allowed on the beach or banned, does not matter

Please turn over

SECTION B

Circle just one number in each row

I must never be able to smell cooking food on the beach	1	2	3	4	5	The smell of food being cooked does not matter to me
I must never be able to detect smells from factories when on the beach	1	2	3	4	5	I don't mind smells from factories
I don't mind if I can smell traffic fumes on the beach	1	2	3	4	5	There must never be no traffic fumes detectable on the beach
It does not matter if there are smells of seaweed or fishy smells	1	2	3	4	5	There must never be no smells of seaweed or fishy smells
There must never be any noise from roads and railways when on the beach	1	2	3	4	5	I don't mind if I can hear noise from roads and railways
I don't mind if I can hear noise from factories	1	2	3	4	5	There must never be any noise from factories when on the beach
It does not matter if there are no rock pools at the beach	1	2	3	4	5	It is essential there are rock pools with fish, plants and animals
I don't mind if there are no toilets at the beach	1	2	3	4	5	Public toilets are essential at the beach
It is essential that the toilets must be clean	1	2	3	4	5	I don't care whether the toilets are clean or dirty
I must always be able to take a shower when on the beach	1	2	3	4	5	I don't mind if there are no showers at the beach
It is essential that the beach has plenty of sand	1	2	3	4	5	I don't mind if there is little or no sand at the beach
It is essential that the sand has a pleasant colour	1	2	3	4	5	The colour of the sand does not matter to me
There must never be insects or flies present at the beach	1	2	3	4	5	I don't mind if there may be insects or flies present
There must always be fresh water for washing and drinking available	1	2	3	4	5	I don't mind if fresh water is not available
I don't mind if sunbeds and chairs are not available	1	2	3	4	5	It is essential that I can hire sunbeds and chairs

SECTION C

Circle just one number in each row

The temperature at the beach is not important	1	2	3	4	5	It is essential that the temperature at the beach is pleasant
It does not matter if the sun is not shining	1	2	3	4	5	It is essential that the weather is sunny
It is essential that the weather must be dry	1	2	3	4	5	I don't mind if the weather is dry or not
I don't mind if it is too windy or still	1	2	3	4	5	It is essential that the wind is pleasant
Cleanliness of bathing water does not matter to me	1	2	3	4	5	It is essential that the bathing water is clean
Pollution in the sea does not matter to me	1	2	3	4	5	It is imperative that the sea is free of pollution
It is essential that no leaves or litter are floating in the sea	1	2	3	4	5	Floating leaves and litter do not matter to me
Litter on the beach does not matter to me	1	2	3	4	5	It is imperative that the beach is free of litter
It is essential that there is no oil on the beach	1	2	3	4	5	Oil on the beach does not matter to me
Strong currents in the sea do not matter to me	1	2	3	4	5	It is essential that there are no strong currents in the sea
I don't mind if there are hazardous tides	1	2	3	4	5	There must neverbe hazardous tides
I don't mind if there are large waves	1	2	3	4	5	There must never be large waves which might endanger bathers
I don't mind if there are no lifeguards	1	2	3	4	5	It is imperative that there are lifeguards at the beach
I don't mind if there may be dangerous animals in the water	1	2	3	4	5	Harmful animals (jellyfish or sharks) must never be present in the water
It is essential that the shore is free from sharp rocks and pits	1	2	3	4	5	I don't mind if there are sharp rocks or pits
I don't mind if there might be danger from falling rocks	1	2	3	4	5	There must never be any danger from falling rocks on the beach
It is essential that the shore is free from seaweed	1	2	3	4	5	Seaweed on the beach does not matter to me

PART 3

Please put the following aspects of a beach in order of their importance to you (1 for the most important, then 2, then 3, etc.).

Put a number in each box

Good facilities ☐
Clean sand and water ☐
Attractive views and landscape ☐
Safe bathing and swimming ☐
Good access and parking ☐

XXXX

Appendix 9

Main Study - 5th Draft of Questionnaire

To be completed by interviewer:

Beach..... Date..... Time.....

Weather conditions (tick):	Sunny	Dry	Hot (over 70°F)	Calm
	Broken Cloud	Drizzle/showers	Warm (60 - 70°F)	Breezy
	Overcast	Persistant rain	Cool (under 60°F)	Windy

Sea conditions (breaking wave size): Flat calm (4 - 12 ins.) (1 - 3 ft.) (3 - 6 ft.) (over 6 ft.)

This questionnaire is designed to find out what people like and dislike about different aspects of beaches and what things they think are most important at the beach.

PART 1

First, please tell us a little about yourself and your visit to the beach today:

Age..... Sex..... Occupation.....

How far have you travelled today (in miles)..... How long do you intend staying on the beach (in hours).....

PART 2

Please indicate your preferences for beach features by putting '1' in the box after the feature you would most like, then '2', '3' and so on in the other boxes.

EXAMPLE:

FOR QUESTION 3, 'I'd like the beach to be made of:';

IF YOU LIKED A BEACH OF *SAND* THE BEST, FOLLOWED BY A BEACH OF *GRAVEL*, THEN A BEACH OF *STONES BIGGER THAN A GOLF BALL* AND LIKED A BEACH MADE OF *MUD* THE LEAST, YOU COULD PUT:

stones bigger than a golf ball [3] gravel [2] sand [1] mud [4]

Now try this one yourself

Suppose you preferred a beach with just basic refreshments, but would definitely avoid one with no refreshments at all. Try filling in the boxes below.

At the beach, I'd like:

cafes with a wide selection of food [ ] just basic refreshments [ ] no cafes or kiosks [ ]

You could have put:

cafes with a wide selection of food [2] just basic refreshments [1] no cafes or kiosks [3]

Please turn over

SECTION A

1. I'd like the beach to be made of:
stones bigger than a golf ball ☐ gravel ☐ sand ☐ mud ☐

2. I'd like colour of the sand to be:
grey ☐ black ☐ brown ☐ light tan ☐ white ☐

3. I'd like the sea temperature to be:
Cold (less than 50°F) ☐ cool (50 to 60°F) ☐ neither cold nor warm (60 to 70°F) ☐
warm (70 to 80°F) ☐ hot (80 to 90°F) ☐ very hot (over 90°F) ☐

4. On the beach in a swimming costume I'd like to feel:
cold ☐ cool ☐ neither cold nor warm ☐
warm ☐ hot ☐ very hot ☐

5. I'd like the beach to be:
very exposed ☐ sheltered but with some breeze ☐ sheltered from all breezes ☐

6. I'd like the beach to have:
patchy sand with rocks sticking up ☐ smooth, flat rock ☐ lots of sand ☐

7. On the sea I'd like to see waves:
over 6 feet high ☐ 3 to 6 feet high ☐ 1 to 3 feet high ☐ 4 inches to 1 foot high ☐ under 4 inches high ☐

8. I'd like the beach to be:
flat ☐ gently sloping ☐ steeply sloping ☐

9. If I walk 10 yards into the sea, I'd like the water to be (for an adult):
up to my neck ☐ up to my waist ☐ up to my knees ☐ at my ankles ☐

10. I'd like the beach:
to have a wide, signposted road to it ☐ to have signs, but not a wide road ☐ to be down a narrow road ☐

Please turn over

SECTION B

1. To get onto the beach, I'd like:

a road or tarmac path to walk on ☐ a level path ☐ a rough path ☐ no path at all ☐

2. I'd like the beach to have:

a large car park within 200 yards of the beach ☐ a car park over 200 yards away (but within ½ mile) ☐

no car park within ½ mile ☐

3. At the beach, I'd like watersports like water-skiing, jet-skiing and windsurfing:

to be allowed anywhere ☐ only allowed in one area ☐ to be banned ☐

4. At the beach, I'd like:

cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

5. I'd like:

a bar or cafe serving alcohol at the beach ☐ no alcohol served ☐

6. I would like the width of the beach when the sea is out (low tide) to be:

less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐

between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

7. I would like the width of the beach when the sea is in (high tide) to be:

less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐

between 200 yards and ¼ mile ☐ between ¼ mile and ½ mile ☐ more than ½ mile ☐

8. I'd like:

vehicles to be allowed to drive on the beach ☐ no vehicles to be allowed on the beach ☐

9. I'd like dogs:

to be allowed on the beach ☐ banned from the beach ☐

Please turn over

PART 3

CIRCLE A NUMBER BETWEEN 1 AND 5 IN EACH ROW TO SHOW HOW MUCH YOU AGREE/DISAGREE WITH THE STATEMENTS AT EACH END.

SECTION A

Circle just one number in each row

The water temperature does not matter to me	1	2	3	4	5	It is essential that the bathing water is at the right temperature for me
I don't mind whether or not the beach is sheltered	1	2	3	4	5	The beach must always have the amount of shelter I like
Whether the sea is calm or has big waves is extremely important	1	2	3	4	5	Whether the sea is calm or has big waves does not matter
Whether the beach is level or slopes down to the water is extremely important	1	2	3	4	5	I don't mind whether the beach is level or slopes down to the water
I don't mind whether the water gets deep quickly or slowly when wading in	1	2	3	4	5	How quickly the water gets deep when wading in is extremely important
Whether there is a wide road or a narrow lane to the nearest car park is extremely important	1	2	3	4	5	I don't mind whether there is a wide road or a narrow lane to the nearest car park
I don't mind whether car parks are close by or far away	1	2	3	4	5	Whether car parks are close to the beach, or far away is extremely important
Whether water sports are allowed in the sea, or banned is extremely important	1	2	3	4	5	I don't mind whether water sports are banned or allowed at the beach
The level of refreshment facilities must be exactly right for me	1	2	3	4	5	I don't mind about the level of refreshment facilities
I don't mind whether alcohol is or is not served at the beach	1	2	3	4	5	Whether alcohol is or is not served at the beach is extremely important
The distance to the sea at low tide does not matter	1	2	3	4	5	The distance to the sea when the sea is out (low tide) is extremely important
The distance to the sea when the sea is in (high tide) is extremely important	1	2	3	4	5	The distance to the sea at high tide does not matter
How easy or difficult it is for people to get onto the beach does not matter	1	2	3	4	5	How easy or difficult it is to get onto the beach (on a road or path) is extremely important
Whether vehicles are allowed on the beach or banned, does not matter	1	2	3	4	5	Whether vehicles are allowed on, or banned from the beach is extremely important
Whether dogs are allowed on, or banned from the beach is extremely important	1	2	3	4	5	Whether dogs are allowed on the beach or banned, does not matter

Please turn over

SECTION B

Circle just one number in each row

I must never be able to smell cooking food on the beach	1	2	3	4	5	The smell of food being cooked does not matter to me
I must never be able to detect smells from factories when on the beach	1	2	3	4	5	I don't mind smells from factories
I don't mind if I can smell traffic fumes on the beach	1	2	3	4	5	There must never be no traffic fumes detectable on the beach
It does not matter if there are smells of seaweed or fishy smells	1	2	3	4	5	There must never be no smells of seaweed or fishy smells
There must never be any noise from roads and railways when on the beach	1	2	3	4	5	I don't mind if I can hear noise from roads and railways
I don't mind if I can hear noise from factories	1	2	3	4	5	There must never be any noise from factories when on the beach
It does not matter if there are no rock pools at the beach	1	2	3	4	5	It is essential there are rock pools with fish, plants and animals
I don't mind if there are no toilets at the beach	1	2	3	4	5	Public toilets are essential at the beach
It is essential that the toilets must be clean	1	2	3	4	5	I don't care whether the toilets are clean or dirty
I must always be able to take a shower when on the beach	1	2	3	4	5	I don't mind if there are no showers at the beach
It is essential that the beach has plenty of sand	1	2	3	4	5	I don't mind if there is little or no sand at the beach
It is essential that the sand has a pleasant colour	1	2	3	4	5	The colour of the sand does not matter to me
There must never be insects or flies present at the beach	1	2	3	4	5	I don't mind if there may be insects or flies present
There must always be fresh water for washing and drinking available	1	2	3	4	5	I don't mind if fresh water is not available
I don't mind if sunbeds and chairs are not available	1	2	3	4	5	It is essential that I can hire sunbeds and chairs
It is essential that there are lots of interesting plants and flowers around the beach	1	2	3	4	5	It doesn't matter to me if there are no plants and flowers
Whether the beach is of sand, stones or mud is extremely important	1	2	3	4	5	I don't care what the beach is made of
I don't mind if there may be sewage debris on the beach	1	2	3	4	5	There must never be any sewage debris on the beach

Please turn over

SECTION C

Circle just one number in each row

Whether the beach is sheltered or not, does not matter	1	2	3	4	5	The beach must always have exactly the amount of shelter I like
The temperature at the beach is not important	1	2	3	4	5	It is essential that the temperature at the beach is pleasant
It does not matter if the sun is not shining	1	2	3	4	5	It is essential that the weather is sunny
It is essential that the weather must be dry	1	2	3	4	5	I don't mind if the weather is dry or not
I don't mind if it is too windy or still	1	2	3	4	5	It is essential that the wind is pleasant
I don't mind what the water temperature is	1	2	3	4	5	The bathing water temperature must be exactly right for me
The clarity of the bathing water does not matter to me	1	2	3	4	5	It is essential that the bathing water is always absolutely clear
Pollution in the sea does not matter to me	1	2	3	4	5	It is imperative that the sea is free of pollution
It is essential that no leaves or litter are floating in the sea	1	2	3	4	5	Floating leaves and litter do not matter to me
Whether the beach is level or slopes down to the water is extremely important	1	2	3	4	5	Whether the beach is level or slopes down to the water, does not matter
Whether the sea is calm or has big waves is extremely important	1	2	3	4	5	I don't mind whether the sea is calm or has big waves
Litter on the beach does not matter to me	1	2	3	4	5	It is imperative that the beach is free of litter
It is essential that there is no oil on the beach	1	2	3	4	5	Oil on the beach does not matter to me
Strong currents in the sea do not matter to me	1	2	3	4	5	It is essential that there are no strong currents in the sea
I don't mind if there are hazardous tides	1	2	3	4	5	There must never be hazardous tides
I don't mind if there are large waves	1	2	3	4	5	There must never be large waves which might endanger bathers
I dont mind whether the water gets deep quickly or slowly when wading in	1	2	3	4	5	How quickly the water gets deep when wading in is extremely important
I don't mind if there are no lifeguards	1	2	3	4	5	It is imperative that there are always lifeguards at the beach in summer
I don't mind if there may be dangerous animals in the water	1	2	3	4	5	Harmful animals (jellyfish or sharks) must never be present in the water
It is essential that the shore is free from sharp rocks and pits	1	2	3	4	5	I don't mind if there are sharp rocks or pits
I don't mind if there might be danger from falling rocks	1	2	3	4	5	There must never be any danger from falling rocks on the beach
It is essential that the shore is free from seaweed	1	2	3	4	5	Seaweed on the beach does not matter to me

Please turn over

PART 4

Please put the following aspects of a beach in order of their importance to you (1 for the most important, then 2, then 3, etc.).

Put a number in each box

Good facilities ☐
Clean sand and water ☐
Attractive views and landscape ☐
Safe bathing and swimming ☐
Good access and parking ☐

XXXX

Appendix 10

Main Study - Final Questionnaire

UNIVERSITY OF GLAMORGAN

BEACH USER QUESTIONNAIRE

School of Applied Sciences
Chemical and Environmental
Sciences Division
Pontypridd
Mid Glamorgan CF37 1DL

To be completed by interviewer:

Beach..... Date..... Time.....

Weather conditions (tick one box per column):

Dry ☐	Sunny ☐	Calm ☐
Drizzle/showers ☐	Broken Cloud ☐	Breezy ☐
Persistent rain ☐	Overcast ☐	Windy ☐

Sea conditions (breaking wave size; tick one box): under 4 ins ☐ 4 - 12 ins ☐ 1 - 3 ft ☐ 3 - 6 ft. ☐ over 6 ft. ☐

Approximate temperature:(tick one box): under 50°F ☐ 50 - 60 °F ☐ 60 - 70°F ☐ 70 - 80°F ☐ 80 - 90°F ☐ over 90°F ☐

***Dear Beach User*: This questionnaire is designed to find out what people like and dislike about different aspects of beaches and what things they think are most important at the beach.**

PART 1

First, please tell us a little about yourself and your visit to the beach today:

Age..... Sex.....
How far have you travelled today (in miles).....
Where do you come from?.....

Occupation.....
How long do you intend staying on the beach (in hours).....
What is your accomodation (if not at home)?.....

Please tell us how often you visit **this** particular beach (please tick one box only):

Daily, summer and winter ☐ Weekly, summer and winter ☐ Less than weekly, summer and winter ☐ Summer daily, winter weekly ☐

Summer weekly, winter less than weekly ☐ In summer only ☐ First visit ☐

Please turn over

PART 2

In this part of the questionnaire, please indicate your preferences for beach features by putting '1' in the box after the feature you would most like, then '2', '3' and so on in the other boxes.

EXAMPLE:

FOR QUESTION 1, 'I'd like the beach to be made of:';

IF YOU LIKED A BEACH OF *SAND* THE BEST, FOLLOWED BY A BEACH OF *GRAVEL*, THEN A BEACH OF *STONES BIGGER THAN A GOLF BALL* AND LIKED A BEACH MADE OF *MUD* THE LEAST, YOU COULD PUT:

stones bigger than a golf ball [3] gravel [2] sand [1] mud [4]

326

Now try this one yourself

Suppose you preferred a beach with just basic refreshments, but would definitely avoid one with no refreshments at all. Try filling in the boxes below

At the beach, I'd like:

cafes with a wide selection of food [ ] just basic refreshments [ ] no cafes or kiosks [ ]

You could have put:
cafes with a wide selection of food [2] just basic refreshments [1] no cafes or kiosks [3]

Please remember it is **your own** opinions and preferences we are interested in

Please turn over

SECTION A

1. I'd like the beach to be made of:
stones bigger than a golf ball ☐ gravel ☐ sand ☐ mud ☐

2. I'd like colour of the sand to be:
grey ☐ black ☐ brown ☐ light tan ☐ white ☐

3. I'd like the sea temperature to be:
Cold (less than 50°F) ☐ cool (50 to 60°F) ☐ neither cold nor warm (60 - 70°F) ☐
warm (70 to 80°F) ☐ hot (80 to 90°F) ☐ very hot (over 90°F) ☐

4. On the beach **in a swimming costume** I'd like to feel:
cold ☐ cool ☐ neither cold nor warm ☐
warm ☐ hot ☐ very hot ☐

5. I'd like the beach to be:
very exposed ☐ sheltered but with some breeze ☐ sheltered from all breezes ☐

6. I'd like the beach to have:
patchy sand with rocks sticking up ☐ smooth, flat rock ☐ lots of sand ☐

7. On the sea I'd like to see waves:
over 6 feet high ☐ 3 to 6 feet high ☐ 1 to 3 feet high ☐ 4 inches to 1 foot high ☐ under 4 inches high ☐

8. I'd like the beach to be:
flat ☐ gently sloping ☐ steeply sloping ☐

9. If I walk 10 yards into the sea, I'd like the water to be (for an adult):
up to my neck ☐ up to my waist ☐ up to my knees ☐ at my ankles ☐

10. I'd like the beach:
to have a wide, signposted road to it ☐ to have signs, but not a wide road ☐ to be down a narrow road ☐

Please turn over

SECTION B

1. To get onto the beach, I'd like:
a road or tarmac path to walk on ☐ a level path ☐ a rough path ☐ no path at all ☐

2. I'd like the beach to have:
a large car park within 200 yards of the beach ☐ a car park over 200 yards away (but within ½ mile) ☐
no car park within ½ mile ☐

3. At the beach, I'd like watersports like water-skiing, jet-skiing and windsurfing:
to be allowed anywhere ☐ only allowed in one area ☐ to be banned ☐

4. At the beach, I'd like:
cafes with a wide selection of food ☐ just basic refreshments ☐ no cafes or kiosks ☐

5. I'd like:
a bar or cafe serving alcohol at the beach ☐ no alcohol served ☐

6. I would like the width of the beach when the sea is out (low tide) to be:
less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
between 200 and 400 yards ☐ between 400 and 800 yards ☐ more than 800 yards ☐

7. I would like the width of the beach when the sea is in (high tide) to be:
less than 20 yards ☐ between 20 and 50 yards ☐ between 50 and 200 yards ☐
between 200 and 400 yards ☐ between 400 and 800 yards ☐ more than 800 yards ☐

8. I'd like:
vehicles to be allowed to drive on the beach ☐ no vehicles to be allowed on the beach ☐

9. I'd like dogs:
to be allowed on the beach ☐ banned from the beach ☐

Please turn over

PART 3

CIRCLE A NUMBER BETWEEN 1 AND 5 IN EACH ROW TO SHOW HOW MUCH **YOU** AGREE/DISAGREE WITH THE STATEMENTS AT EACH END.

SECTION A **Circle just one number in each row**

The water temperature does not matter to me	1	2	3	4	5	It is essential that the bathing water is at the right temperature for me
I don't mind whether or not the beach is sheltered	1	2	3	4	5	The beach must always have the amount of shelter I like
Whether the sea is calm or has big waves is extremely important	1	2	3	4	5	Whether the sea is calm or has big waves does not matter
Whether the beach is level or slopes down to the water is extremely important	1	2	3	4	5	I don't mind whether the beach is level or slopes down to the water
I don't mind whether the water gets deep quickly or slowly when wading in	1	2	3	4	5	How quickly the water gets deep when wading in is extremely important
Whether there is a wide road or a narrow lane to the nearest car park is extremely important to me	1	2	3	4	5	I don't mind whether there is a wide road or a narrow lane to the nearest car park
I don't mind whether car parks are close by or far away	1	2	3	4	5	Whether car parks are close to the beach, or far away is extremely important to me
Whether water sports are allowed in the sea, or banned is extremely important to me	1	2	3	4	5	I don't mind whether water sports are banned or allowed at the beach
The level of refreshment facilities must be exactly right for me	1	2	3	4	5	I don't mind about the level of refreshment facilities
I don't mind whether alcohol is or is not served at the beach	1	2	3	4	5	Whether alcohol is served at the beach is extremely important to me
The distance to the sea at low tide does not matter to me	1	2	3	4	5	The distance to the sea when the sea is out (low tide) is extremely important to me
The distance to the sea when the sea is in (high tide) is extremely important to me	1	2	3	4	5	The distance to the sea at high tide does not matter to me
How easy or difficult it is for people to get onto the beach (on a road or path) does not matter to me	1	2	3	4	5	How easy or difficult it is to get onto the beach is extremely important to me
Whether vehicles are allowed on the beach or banned, does not matter to me	1	2	3	4	5	Whether vehicles are allowed on, or banned from the beach is extremely important to me
Whether dogs are allowed on, or banned from the beach is extremely important to me	1	2	3	4	5	Whether dogs are allowed on the beach or banned, does not matter to me

Please turn over

SECTION B

Circle just one number in each row

I must never be able to smell cooking food on the beach	1	2	3	4	5	The smell of food being cooked does not matter to me
I must never be able to detect smells from factories when on the beach	1	2	3	4	5	I don't mind smells from factories
I don't mind if I can smell traffic fumes on the beach	1	2	3	4	5	There must never be traffic fumes detectable on the beach
It does not matter to me if there are smells of seaweed or fishy smells	1	2	3	4	5	There must never be smells of seaweed or fishy smells
There must never be any noise from roads and railways when I'm on the beach	1	2	3	4	5	I don't mind if I can hear noise from roads and railways
I don't mind if I can hear noise from factories	1	2	3	4	5	There must never be any noise from factories when on the beach
It does not matter to me if there are no rock pools at the beach	1	2	3	4	5	It is essential to me that there are rock pools with fish, plants and animals
I don't mind if there are no toilets at the beach	1	2	3	4	5	Public toilets are essential to me at the beach
It is essential that the toilets must be clean	1	2	3	4	5	I don't care whether the toilets are clean or dirty
I must always be able to take a shower when on the beach	1	2	3	4	5	I don't mind if there are no showers at the beach
It is essential to me that the beach has plenty of sand	1	2	3	4	5	I don't mind if there is little or no sand at the beach
It is essential to me that the sand has a pleasant colour	1	2	3	4	5	The colour of the sand does not matter to me
There must never be insects or flies present at the beach	1	2	3	4	5	I don't mind if there may be insects or flies present
There must always be fresh water for washing and drinking available	1	2	3	4	5	I don't mind if fresh water is not available
I don't mind if sunbeds and chairs are not available	1	2	3	4	5	It is essential that I can hire sunbeds and chairs
It is essential to me that there are lots of interesting plants and flowers around the beach	1	2	3	4	5	It doesn't matter to me if there are no plants and flowers
Whether the beach is of sand, stones or mud is extremely important to me	1	2	3	4	5	I don't care what the beach is made of
I don't mind if very small amounts of sewage debris may be present	1	2	3	4	5	There must never be any trace of sewage debris on the beach

Please turn over

SECTION C

Circle just one number in each row

Whether the beach is sheltered or not, does not matter to me	1	2	3	4	5	The beach must always have exactly the amount of shelter I like
The temperature at the beach is not important to me	1	2	3	4	5	It is essential to me that the temperature at the beach is pleasant
It does not matter to me if the sun is not shining	1	2	3	4	5	It is essential to me that the weather is sunny
It is essential to me that the weather must be dry	1	2	3	4	5	I don't mind if the weather is dry or not
I don't mind if it is too windy or still	1	2	3	4	5	It is essential to me that the wind is pleasant
I don't mind what the water temperature is	1	2	3	4	5	The bathing water temperature must be exactly right for me
The clarity of the bathing water does not matter to me	1	2	3	4	5	It is essential to me that the bathing water is always absolutely clear
Pollution bathing water does not matter to me	1	2	3	4	5	It is vital to me that the bathing water is free of pollution
It is essential to me that no leaves or litter are floating in the sea	1	2	3	4	5	Floating leaves and litter do not matter to me
Whether the beach is level or slopes steeply down to the water is extremely important to me	1	2	3	4	5	Whether the beach is level or slopes steeply down to the water, does not matter to me
Whether the sea is calm or has big waves is extremely important	1	2	3	4	5	I don't mind whether the sea is calm or has big waves
Litter on the beach does not matter to me	1	2	3	4	5	It is imperative that the beach is free of litter
It is essential that there is no oil on the beach	1	2	3	4	5	Oil on the beach does not matter to me
Strong currents along the shore do not matter to me	1	2	3	4	5	It is essential to me that there are no strong currents along the shore
I don't mind if there may be dangerous undertows (rip currents)	1	2	3	4	5	There must never be dangerous rip currents
I don't mind if there are large waves	1	2	3	4	5	There must never be big waves which might endanger me when bathing
I dont mind whether the water gets deep quickly or slowly when wading in	1	2	3	4	5	How quickly the water gets deep when wading in is extremely important to me
I don't mind if there are no lifeguards or first aid available at the beach	1	2	3	4	5	It is imperative that there are always lifeguards and first aid available at the beach in summer
I don't mind if there may be dangerous animals in the water	1	2	3	4	5	Harmful animals (jellyfish or sharks) must never be present in the water
It is essential to me that there are no rocks and pits just below the water	1	2	3	4	5	I don't mind if there are rocks or pits just below the water
I don't mind if there might be danger from falling rocks	1	2	3	4	5	There must never be any danger from falling rocks on the beach
It is essential to me that the beach is free from seaweed	1	2	3	4	5	Seaweed on the beach does not matter to me

Please turn over

PART 4

Please put the following aspects of a beach in order of their importance to you (1 for the most important, then 2, then 3, etc.).

	Put a number in each box
Good facilities	
Clean sand and water	
Attractive views and landscape	
Safe bathing and swimming	
Good access and parking	

XXXX

Appendix 11

List of Welsh Beaches from Which Questionnaire Survey Beaches Selected

Beach	Grid Ref.
Penarth	190 713
Lavernock	184 679
Barry - St. Mary's Well Bay	175 675
Barry - Jackson's Bay	122 665
Barry - Whitmore Bay	114 662
Barry - Cold Knap	096 664
Barry - The Knap	098 664
Barry - Little Island Bay	110 660
Barry - Watch House Bay	-
Ffontagari Bay	051 658
Limpert Bay	015 663
Llantwit Major (Col-huw)	955 673
Tresilian Bay	957 677
St. Donats Bay	936 678
Nash	913 684
Southerndown (Dunraven Bay)	884 729
Ogmore by Sea	752 860
Porthcawl - Newton Bay	840 768
Porthcawl - Trecco Bay	831 763
Porthcawl - Sandy Bay	824 765
Porthcawl - Rest Bay	800 779
Kenfig Sands	788 803
Margam Sands	773 845
Aberafan	739 896
Aberafan, West	728 906
Jersey Marine (Crymlyn Burrows)	709 916
Swansea Bay	644 921
Swansea - Black Pill	632 898
Mumbles	625 878
Bracelet Bay	630 871
Limeslade Bay	625 870
Langland Bay	606 872
Caswell Bay	591 874
Brandy Cove	585 847
Pwll Du Bay	575 868
Three Cliffs Bay	535 876

Beach	Grid Ref.
Oxwich Bay	505 865
Port Eynon Bay	470 850
Meweslade Bay	420 870
Fall Bay	412 872
Rhossili Bay	412 882
Llangennith	408 913
Broughton Bay	422 932
Whiteford Sands	435 943
Llanelli Beach	496 995
Burry Port Beach (East)	446 002
Pembray Sands	405 995
Pendine Sands	235 077
(Between Ragwen & Gilman Points)	225 074
Marros Sands	205 074
Amroth	167 068
Wiseman's Bridge (Saundersfoot)	146 060
Saundersfoot Beach (Coppet Hall)	141 047
Tenby - North	134 008
Tenby - South	132 998
Lydstep Haven	091 980
Skrinkle Haven	080 973
Manorbier Beach	060 974
Swanlake Bay	045 980
Freshwater East	019 979
Barafundle Bay (Stackpole)	992 950
Broadhaven (South)	979 939
Freshwater West	882 997
West Angle Bay	852 033
Lindsway Bay	843 066
Dale	813 058
Watwick Bay	815 040
Westdale Bay	798 058
Marloes Sands	780 076
Musselwick Sands (Marloes)	785 090
St. Brides Haven	801 109
Little Haven	856 132
Broad Haven	861 138
Druidston Haven	860 170
Nolton Haven	858 185

Beach	Grid Ref.
Newgale Sands	847 220
Solva	802 240
Caerfai Bay	760 243
Whitesands Bay	732 270
Porthmelgan	727 278
Abereiddi Bay	796 312
Traeth Llyfn	802 320
Porth-gain	813 326
Abercastle	852 338
Aber Mawr	882 346
Pwll Crochan	885 364
Goodwick Harbour	948 381
Goodwick Sands	949 379
Pwllgwealod	003 399
Cwm-yr-Eglwys	015 401
Newport Sands (South)	052 405
Newport (Cesig Duon)	053 407
Poppit Sands	152 489
Gwbert	162 493
Mwnt	194 519
Aberporth West (slip)	257 517
Aberporth East	259 515
Tresaith	280 517
Penbryn	292 525
Llangranog	310 542
Cwmtydu	355 576
New Quay (Centre; Harbour)	391 601
New Quay (South)	392 596
New Quay (Traeth Gwyn)	398 597
Little Quay Bay (Cei-bach)	408 598
Gilfach-yr-Halen	434 614
Aberaeron	456 631
Aberarth	478 640
Llansantffraid (Llanon)	509 675
Llanrystud	529 699
Morfa Bychan	565 774
Tanybwlch (Aberystwyth)	579 800
Aberystwyth South	579 814
Aberystwyth Harbour	582 812

Beach	Grid Ref.
Aberystwyth North	583 822
Clarach Bay (S of river)	586 837
Clarach Bay (N of river)	585 840
Wallog	590 858
Borth	606 901
Ynyslas	604 925
Aberdyfi	607 958
Tywyn	576 003
Llwyngwril	589 102
Fairbourne	609 130
Barmouth	608 159
Llanaber	598 178
Tal-y-bont	578 212
Llanenddwyn	566 230
Llandanwg	566 281
Harlech	567 314
Morfa Bychan	542 359
Criccieth	503 380
Afon Wen	443 370
Morfa Aberech	404 358
Pwllheli (South Beach)	371 341
Llanbedrog	333 314
The Warren	320 295
Abersoch (jetty)	316 284
Abersoch	316 277
Machroes	317 266
Porth Ceiriad	312 248
Tai Morfa (Hell's Mouth)	282 264
Treheli	239 281
Aberdaron	172 263
Porth Oer	166 300
Porth Iago	167 316
Porth Colmon	194 343
Traeth Penllech	204 344
Porth Towyn (Rhos-y-Llan)	232 377
Porth Dinllaen (Morfa Nefyn)	275 415
Morfa Nefyn	282 409
Porth Nefyn (Nefyn)	301 408
Trefor (Gwydir)	377 474

Beach	Grid Ref.
Pontllyfni	430 525
Dinas Dinlli	434 566
Llanddwyn Bay	405 633
Traeth Mawr (Aberffraw Bay)	355 677
Porth Trecastell	333 707
Porth Nobla	320 713
Rhosneigr (Traeth Llydan)	323 721
Rhosneigr (Traeth Crigyll)	315 730
Borthwen (Rhoscolyn)	273 741
Trearddur Bay	255 789
Holyhead (Newry Beach)	263 817
Traeth y Gribin	292 818
Porth Penrhyn Mawr	287 838
Porth Trefadog	292 862
Porth Trwyn	295 878
Porth Swtan	301 894
Cemaes Bay	373 973
Moelfre (Traeth Lligwy)	495 873
Traeth Bychan	516 847
Benllech	526 825
Red Wharf Bay	565 806
Beaumaris	609 762
Llanfairfechan	678 756
Penmaenmawr	711 765
Deganwy (North)	775 795
Llandudno (West)	770 816
Llandudno (N/E)	791 822
Penrhyn Bay	823 820
Rhos-on-sea	843 805
Colwyn Bay	858 791
Colwyn Bay (opp. Rhos Abbey Hotel)	-
Colwyn Bay (end Cayley Prom.)	-
Llanddulas	905 787
Abergele (Pensarn)	949 789
Abergele (Towyn)	963 795
Kinmel Bay	978 806
Rhyl	002 826
Y-Ffrith	046 833
Prestatyn	054 839

Beach	Grid Ref.
Talacre (Point of Air)	122 853

Appendix 12

Pilot Beach Checklist

BEACH QUALITY RATING CHECKLIST (WALES)

Resort/Beach.....

Map Ref. ..... Date.....

Time of survey.....

Weather conditions:

Sunny		Dry		Flat calm	
Broken cloud		Drizzle/showers		10 - 30cms	
Overcast		Rain		30 - 100cms	
				1 - 2m	
Hot (>20°C)		Calm		>2m	
Warm (15 - 20°C)		Breezy			
Cool (<15°C)		Windy			

Sea conditions (breaking wave size):

PHYSICAL FACTORS

1. Beach width at mean low tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m

2. Beach width at mean high tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m

3. Predominant beach material (above high water mark)

Cobbles (>5 cm)	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud

4. Predominant beach material (below high water mark

Cobbles (>5 cm)	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud

5. Water temperature (mean during EC bathing season)

<10 °C	10 - 15 °C	16 - 21 °C	22 - 26 °C	27 - 32 °C	>32 °C

6. Beach microclimate (shelter from wind, etc.)

Very exposed	Sheltered, some breeze	Tightly enclosed/over sheltered

7. Size of breaking waves

<10cm	10 - 30cm	30 cm - 1m	1 - 2m	>2m

8. Average beach slope above high water mark

<5°	5 - 20°	Very steep (>20°)

9. Distance from water edge to 50 cm water depth (mid-tide)

3m or less	3 - 7m	7 - 20m	>20m

10. Submerged obstacles, trenches, pits, sharp rocks

Many, large/deep	Few	Occasional	None

11. Sand colour

Black	Grey	Brown	Light tan	White

12. Amount/thickness of sand

Patchy sand with protruding rocks	Smooth, flat rock	Good sand cover

13. Presence of dangerous cliffs, precipices, etc.

Dangerous, loose cliffs directly above beach	Cliffs, negligible stonefall danger	None directly above beach

14. Water clarity; can see bottom at max.depth (at mid-tide) of:

<1m	1 - 2m	2 - 3m	3 - 4m	>4m

15. Beach safety rating, based on:

(a) Beach type — Dissipative: wide surf zone, fine sand
Intermediate
Reflective: steep slope, medium to coarse sand, 0 - 1m breakers

(b) Wave size (to nearest 0.5m)

SUBTRACT ☐ out of: . (calculated score based on beach morphology, tide and wave height. Devised by Coastal Studies Unit, University of Sydney)

16. Coastal Landscape Aesthetic Quality Score ☐ out of . (based on mean score given by panel of assessors to a video panorama of the beach area)

17. Beach User Climate Index Value ☐ (calculated score based on summer season temperatures, rainfall, sunshine and wind speeds for locality, obtained from nearest coastal weather station)

BIOLOGICAL FACTORS

18. Floating material (leaves, twigs, debris, litter,)

Much usually present	Some often present	Rarely/never present

19. Smells of rotting fish, seaweed

Often bad	Sometimes present/not severe	Rarely/never present

20. Birdlife

Over abundant/pest proportions	Varied, plentiful birdlife	Some usually present	Absent

21. Other fauna (in rock pools, etc.)

Absent	Some, little variety	Abundant, varied fauna

22. Insects or similar pests

Many	Some often present	Absent

23. Dangerous animals offshore (jellyfish, sharks, weeverfish, etc.); average occurances per season

>5	1 - 5	<1

24. Seaweed (algae) washed up on beach

Usually abundant	Some present	Absent

25. Sewage debris on beach (average number of items along 100m of strandline)

Abundant (>10 items)	Some present (1 - 10 items)	Absent

26. Water quality

<95% pass of 'T' (mandatory) stds. (DoE 'fail')	
95% pass of 'T' stds. (DoE 'pass')	
100% pass of 'T' stds.	
100% pass of 'T' stds, 80% pass 'G' (guideline) coliform stds.	
100% pass of 'T' stds, 80% pass 'G' coliform stds, 90% pass 'G' faecal streptococcus stds.	

27. Flora (immediate vicinity of beach; within 100m)

Absent	Some, little variety	Varied, interesting plants with >50% of beach hinterland vegetated

HUMAN USE FACTORS

28. Odours from industry (fumes, smog)

Often bad	Sometimes present/not severe	Rarely/never present

29. Traffic fumes

Often bad	Sometimes present/not severe	Rarely/never present

30. Odours from catering, food preparation

Frequently strong	Sometimes detectable/not strong	Absent

31. Litter on beach (non-sewage)

Usually abundant	Some present	Absent

32. Oil (on rocks, pebbles, in sand, etc.)

Many patches evident on rocks/sand	Traces (occasional spots) present	Absent

33. Access (to resort/nearest car park by vehicle)

Road mainly single track with passing places	
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50m apart	
Well signposted (to beach/resort/nearest car park) metalled road, continuously over 4m wide	

34. Location of nearest car parking

No car park within 1 km	Car park more than 200 m from beach	Car park within 200 m

35. Access (to beach itself from resort/car park)

No clearly visible path to beach	
Path rough or steep or with steps	
Good level path to beach	
Road or wide tarmac/concrete path leading to edge of beach	

36. Toilets - number (of cubicles)

Absent	
1 per gender	
1 - 3 per gender	
>3 per gender	

37. Toilets - cleanliness

Extremely filthy/vandalised	
Quite dirty	
Slightly dirty	
Very clean	

38. Showers

Absent or extremely filthy/vandalised	One only, or several but dirty	>1, clean

39. Fresh water - washing & drinking (including those in toilet block)

None	Tap in wash-hand basin only	Taps (non-potable water)	Potable water

40. Refreshments/cafes

None	Basic refreshments	Wide selection of food & drink

41. Bars

Bars/cafes serving alcohol	
No alcohol served	

42. Chairs/sunbeds

Not available	
Available	

43. Lifeguards

Absent	
Present in busy periods only	
Present throughout EC bathing season	

44. Motor vehicle noise (including from car park) and/or railway noise

Constant high level during day	Some noise	None

45. Noise from industry

Constant high level during day	Often some noise	None

46. Are vehicles permitted on beach?

Vehicles allowed to drive on the beach	
No vehicles allowed on beach	

47. Are animals permitted on the beach?

Dogs or donkeys allowed on beach	
Dogs banned from beach	

48. Are watersports (water-skiiing, jet-skiing, sail boarding), permitted offshore?

Allowed anywhere	
Allowed in one area only	
Banned	

oooooooooooooooooooooooooooooooooooooo

Appendix 13

Final Beach Checklist

BEACH QUALITY RATING CHECKLIST (WALES)

Resort/Beach.....

Map Ref. ..... Date.....

Time of survey.....

Weather conditions:

				Sea conditions (breaking wave size):	
Sunny	☐	Dry	☐	Flat calm	☐
Broken cloud	☐	Drizzle/showers	☐	10 - 30cms	☐
Overcast	☐	Rain	☐	30 - 100cms	☐
				1 - 2m	☐
Hot (>20°C)	☐	Calm	☐	>2m	☐
Warm (15 - 20°C)	☐	Breezy	☐		
Cool (<15°C)	☐	Windy	☐		

PHYSICAL FACTORS

1. Beach width at mean low tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m

2. Beach width at mean high tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m

3. Predominant beach material (above high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud

4. Predominant beach material (below high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud

5. Water temperature (mean during EC bathing season)

<10 °C	10 - 15 °C	16 - 21 °C	22 - 26 °C	27 - 32 °C	>32 °C

6. Beach microclimate (shelter from wind, etc.)

Very exposed	Sheltered, some breeze	Tightly enclosed/over sheltered

7. Size of breaking waves

<10cm	10 - 30cm	30 cm - 1m	1 - 2m	>2m

8. Average beach slope above high water mark

<5°	5 - 20°	Very steep (>20°)

9. Distance from water edge to 50 cm water depth (mid-tide)

3m or less	3 - 7m	7 - 20m	>20m

10. Submerged obstacles, trenches, pits, sharp rocks

Many, large/deep	Few	Occasional	None

11. Sand/beach colour

Black	Grey	Brown	Light tan	White

12. Amount/thickness of sand

Patchy sand with protruding rocks	Smooth, flat rock	Good sand cover

13. Presence of dangerous cliffs, precipices, etc.

Dangerous, loose cliffs directly above beach	Cliffs, negligible stonefall danger	None directly above beach

14. Water clarity; can see bottom at max.depth (at mid-tide) of:

<1m	1 - 2m	2 - 3m	3 - 4m	>4m

15. Beach safety rating, based on:

(a) Beach type — Dissipative: wide surf zone, fine sand
Intermediate
Reflective: steep slope, medium to coarse sand, 0 - 1m breakers

(b) Wave size (to nearest 0.5m)

SUBTRACT ☐ (calculated score based on beach morphology, tide and wave height. Devised by Coastal Studies Unit, University of Sydney)

16. Coastal Landscape Aesthetic Quality Score ☐ (based on mean score given by panel of assessors to a video panorama of the beach area)

17. Beach User Climate Index Value ☐ (calculated score based on summer season temperatures, rainfall, sunshine and wind speeds for locality, obtained from nearest coastal weather station)

BIOLOGICAL FACTORS

18. Floating material (leaves, twigs, debris, litter,)

Much usually present	Some often present	Rarely/never present

19. Smells of rotting fish, seaweed

Often bad	Sometimes present/not severe	Rarely/never present

20. Birdlife

Over abundant/pest proportions	Varied, plentiful birdlife	Some usually present	Absent

21. Other fauna (in rock pools, etc.)

Absent	Some, little variety	Abundant, varied fauna

22. Insects or similar pests

Many	Some often present	Absent

23. Dangerous animals offshore (jellyfish, sharks, weeverfish, etc.); average occurances per season

>5	1 - 5	<1

24. Seaweed (algae) washed up on beach

Usually abundant	Some present	Absent

25. Sewage debris on beach (average number of items along 10m of strandline from examination of 100m)

Abundant (>10 items)	Some present (1 - 10 items)	Absent

26. Water quality

<95% pass of 'I' (mandatory) stds. (DoE 'fail')	
95% pass of 'I' stds. (DoE 'pass')	
100% pass of 'I' stds.	
100% pass of 'I' stds, 80% pass 'G' (guideline) coliform stds.	
100% pass of 'I' stds, 80% pass 'G' coliform stds, 90% pass 'G' faecal streptococcus stds.	

27. Flora (immediate vicinity of beach; within 100m)

Absent	Some, little variety	Varied, interesting plants with >50% of beach hinterland vegetated

HUMAN USE FACTORS

28. Odours from industry (fumes, smog)

Often bad	Sometimes present/not severe	Rarely/never present

29. Traffic fumes

Often bad	Sometimes present/not severe	Rarely/never present

30. Odours from catering, food preparation

Frequently strong	Sometimes detectable/not strong	Absent

31. Litter on beach (non-sewage)

Usually abundant	Considerable amount present	Very little present	Absent

32. Oil (on rocks, pebbles, in sand, etc.)

Many patches evident on rocks/sand	Traces (occasional spots) present	Absent

33. Access (to resort/nearest car park by vehicle)

Road mainly single track with passing places	
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50m apart	
Well signposted (to beach/resort/nearest car park) metalled road, continuously over 4m wide	

34. Location of nearest car parking

No car park within 1 km	Car park more than 200 m from beach	Car park within 200 m

35. Access (to beach itself from resort/car park)

No clearly visible path to beach	
Path rough or steep or with steps	
Good level path to beach	
Road or wide tarmac/concrete path leading to edge of beach	

36. Toilets - number (of cubicles)

Absent	
1 per gender	
1 - 3 per gender	
>3 per gender	

37. Toilets - cleanliness

Extremely filthy/vandalised	
Quite dirty	
Slightly dirty	
Very clean	

38. Showers

Absent or extremely filthy/vandalised	One only, or several but dirty	>1, clean

39. Fresh water - washing & drinking (including those in toilet block)

None	Tap in wash-hand basin only	Taps (non-potable water)	Potable water

40. Refreshments/cafes

None	Basic refreshments	Wide selection of food & drink

41. Bars

Bars/cafes serving alcohol	
No alcohol served	

42. Chairs/sunbeds

Not available	
Available	

43. Lifeguards

Absent	
Present in busy periods only	
Present throughout EC bathing season	

44. Motor vehicle noise (including from car park) and/or railway noise

Constant high level during day	Some noise	None

45. Noise from industry

Constant high level during day	Often some noise	None

46. Are vehicles permitted on beach?

Vehicles allowed to drive on the beach	
No vehicles allowed on beach	

47. Are animals permitted on the beach?

Dogs or donkeys allowed on beach	
Dogs banned from beach	

48. Are watersports (water-skiing, jet-skiing, sail boarding), permitted offshore?

Allowed anywhere	
Allowed in one area only	
Banned	

BEACH TYPE - TICK ONE BOX BELOW WHICH MOST CLOSELY MATCHES THE TYPE OF BEACH/RESORT

a) An **undeveloped** beach with no facilities for visitors at all	
b) A beach with **a few facilities**: such as a toilet, small refreshment kiosk and car park	
c) A beach **at a small resort** with toilets, cafe selling meals, drinks, ice-creams, etc.	
d) A beach **at a medium sized resort** with several cafes, one or more restaurants, fast food outlets, shops, etc.	
e) A beach at a **large, highly developed resort** with many cafes, restaurants, shops, amusements, etc.	

oooooooooooooooooooooooooooooooooooooo

Appendix 14

Dates of Beach Video Filming

Beach	Date of video filming (1994)
St. Mary's Well Bay	28 July
Jackson's Bay (Barry)	28 July
Whitmore Bay (Barry)	28 July
Cold Knap (Barry)	28 July
Llantwit Major	28 July
Nash	28 July
Southerndown	25 August
Ogmore	25 August
Newton Bay (Porthcawl)	25 August
Trecco Bay (Porthcawl)	25 August
Sandy Bay (Porthcawl)	25 August
Rest Bay (Porthcawl)	25 August
Aberafan	25 August
Swansea Bay	25 August
Mumbles	25 August
Bracelet Bay	20 August
Langland Bay	20 August
Caswell Bay	20 August
Three Cliffs Bay	20 August
Oxwich	20 August
Port Eynon	20 August
Rhossili	20 August
Pembray	22 September
Pendine	30 August
Amroth	5 September
Wiseman's Bridge	5 September
Saundersfoot	5 September
Tenby - North	5 September
Tenby - South	5 September
Lydstep Haven	5 September
Manorbier	5 September
Freshwater East	30 August
Barafundle Bay	5 September
Broadhaven (S. Pembs.)	5 September
Marloes Sands	22 September
Broad Haven	22 September
Newgale Sands	22 September
Caerfai Bay	22 September

Beach	Date of video filming (1994)
Whitesands Bay	22 September
Abereiddi Bay	22 September
Newport Sands - North	18 September
Poppit Sands - West	18 September
Mwnt	18 September
Llangranog	18 September
New Quay	18 September
Aberaeron	18 September
Aberystwyth - South	18 September
Aberystwyth - North	18 September
Borth	17 September
Aberdyfi	17 September
Tywyn	17 September
Fairbourne	17 September
Barmouth	17 September
Llandanwg	17 September
Harlech	17 September
Morfa Bychan	17 August
Criccieth	17 August
Pwllheli	17 August
Abersoch	17 August
Dinas Dinlli	17 August
Rhosneigr - Traeth Llydan	16 August
Rhosneigr - Traeth Crigyll	16 August
Trearddur Bay	16 August
Benllech	16 August
Llandudno - West	15 August
Llandudno - North	16 August
Colwyn Bay	16 August
Kinmel Bay	15 August
Rhyl	16 August
Prestatyn	15 August

Appendix 15

Years for Which Climate Data Available from Meteorological Stations, Station Locations and Main Study Beaches Where Data Applied

Beach	Met. Station	Years for Which Data Used
St. Mary's Well Bay	Rhoose	1957 - 1991
Jackson's Bay (Barry)	Rhoose	1957 - 1991
Whitmore Bay (Barry)	Rhoose	1957 - 1991
Cold Knap (Barry)	Rhoose	1957 - 1991
Llantwit Major	Rhoose	1957 - 1991
Nash	Rhoose	1957 - 1991
Southerndown	Rhoose	1957 - 1991
Ogmore	Rhoose	1957 - 1991
Newton Bay (Porthcawl)	Rhoose	1957 - 1991
Trecco Bay (Porthcawl)	Rhoose	1957 - 1991
Sandy Bay (Porthcawl)	Rhoose	1957 - 1991
Rest Bay (Porthcawl)	Rhoose	1957 - 1991
Aberafan	Rhoose	1957 - 1991
Swansea Bay	Rhoose	1957 - 1991
Mumbles	Rhoose	1957 - 1991
Bracelet Bay	Rhoose	1957 - 1991
Langland Bay	Rhoose	1957 - 1991
Caswell Bay	Rhoose	1957 - 1991
Three Cliffs Bay	Rhoose	1957 - 1991
Oxwich	Rhoose	1957 - 1991
Port Eynon	Rhoose	1957 - 1991
Rhossili	Rhoose	1957 - 1991
Pembray	Rhoose	1957 - 1991
Pendine	Aberporth	1957 - 1990
Amroth	Aberporth	1957 - 1990
Wiseman's Bridge	Aberporth	1957 - 1990
Saundersfoot	Aberporth	1957 - 1990
Tenby - North	Aberporth	1957 - 1990
Tenby - South	Aberporth	1957 - 1990
Lydstep Haven	Aberporth	1957 - 1990
Manorbier	Aberporth	1957 - 1990
Freshwater East	Aberporth	1957 - 1990
Barafundle Bay	Aberporth	1957 - 1990
Broadhaven (S. Pembs.)	Aberporth	1957 - 1990
Marloes Sands	Aberporth	1957 - 1990
Broad Haven	Aberporth	1957 - 1990

Beach	Met. Station	Years for Which Data Used
Newgale Sands	Aberporth	1957 - 1990
Caerfai Bay	Aberporth	1957 - 1990
Whitesands Bay	Aberporth	1957 - 1990
Abereiddi Bay	Aberporth	1957 - 1990
Newport Sands - North	Aberporth	1957 - 1990
Poppit Sands - West	Aberporth	1957 - 1990
Mwnt	Aberporth	1957 - 1990
Llangranog	Aberporth	1957 - 1990
New Quay	Aberporth	1957 - 1990
Aberaeron	Aberporth	1957 - 1990
Aberystwyth - South	Aberporth	1957 - 1990
Aberystwyth - North	Aberporth	1957 - 1990
Borth	Aberporth	1957 - 1990
Aberdyfi	Aberporth	1957 - 1990
Tywyn	Aberporth	1957 - 1990
Fairbourne	Aberporth	1957 - 1990
Barmouth	Aberporth	1957 - 1990
Llandanwg	Aberporth	1957 - 1990
Harlech	Aberporth	1957 - 1990
Morfa Bychan	Valley	1931 - 1992
Criccieth	Valley	1931 - 1992
Pwllheli	Valley	1931 - 1992
Abersoch	Valley	1931 - 1992
Dinas Dinlli	Valley	1931 - 1992
Rhosneigr - Traeth Llydan	Valley	1931 - 1992
Rhosneigr - Traeth Crigyll	Valley	1931 - 1992
Trearddur Bay	Valley	1931 - 1992
Benllech	Valley	1931 - 1992
Llandudno - West	Valley	1931 - 1992
Llandudno - North	Valley	1931 - 1992
Colwyn Bay	Valley	1931 - 1992
Kinmel Bay	Valley	1931 - 1992
Rhyl	Valley	1931 - 1992
Prestatyn	Valley	1931 - 1992

Met. Station	Latitude	Longitude	N.G. Ref.
Rhoose	51 24 N	3 20 W	064679
Aberporth	52 08 N	4 34 W	242521
Valley	53 15 N	4 32 W	310758

Appendix 16

Scored Beach Checklist - Beaches with No Visitor Facilities

BEACH QUALITY RATING CHECKLIST (WALES)

Resort/Beach.....

Map Ref. ..... Date.....

Time of survey.....

Weather conditions:

				Sea conditions (breaking wave size):	
Sunny	☐	Dry	☐	Flat calm	☐
Broken cloud	☐	Drizzle/showers	☐	10 - 30cms	☐
Overcast	☐	Rain	☐	30 - 100cms	☐
				1 - 2m	☐
Hot (>20°C)	☐	Calm	☐	>2m	☐
Warm (15 - 20°C)	☐	Breezy	☐		
Cool (<15°C)	☐	Windy	☐		

PHYSICAL FACTORS

1. Beach width at mean low tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.23	0.51	0.88	0.68	0.39	0.27

2. Beach width at mean high tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.59	1.00	0.86	0.39	0.12	0.12

3. Predominant beach material (above high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.45	0.62	1.09	0.05

4. Predominant beach material (below high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.45	0.62	1.09	0.05

5. Water temperature (mean during EC bathing season)

<10 °C	10 - 15 °C	16 - 21 °C	22 - 26 °C	27 - 32 °C	>32 °C
0.06	0.43	0.82	1.13	0.53	0.37

6. Beach microclimate (shelter from wind, etc.)

Very exposed	Sheltered, some breeze	Tightly enclosed/over sheltered
0.18	1.15	0.64

7. Size of breaking waves

<10cm	10 - 30cm	30 cm - 1m	1 - 2m	>2m
0.31	0.53	0.92	0.84	0.57

8. Average beach slope above high water mark

<5°	5 - 20°	Very steep (>20°)
0.68	1.29	0.27

9. Distance from water edge to 50 cm water depth (mid-tide)

3m or less	3 - 7m	7 - 20m	>20m
0.62	1.21	0.86	0.29

10. Submerged obstacles, trenches, pits, sharp rocks

Many, large/deep	Few	Occasional	None
0	0.65	1.30	1.95

11. Sand/beach colour

Black	Grey	Brown	Light tan	White
0.04	0.16	0.57	1.52	1.54

12. Amount/thickness of sand

Patchy sand with protruding rocks	Smooth, flat rock	Good sand cover
N/A	N/A	N/A

13. Presence of dangerous cliffs, precipices, etc.

Dangerous, loose cliffs directly above beach	Cliffs, negligible stonefall danger	None directly above beach
0	1.29	2.58

14. Water clarity; can see bottom at max.depth (at mid-tide) of:

<1m	1 - 2m	2 - 3m	3 - 4m	>4m
0	0.68	1.36	2.04	2.73

15. Beach safety rating, based on:

(a) Beach type — Dissipative: wide surf zone, fine sand
Intermediate
Reflective: steep slope, medium to coarse sand, 0 - 1m breakers

(b) Wave size (to nearest 0.5m)

SUBTRACT up to: **7.07%** (calculated score based on beach morphology, tide and wave height. Devised by Coastal Studies Unit, University of Sydney)

16. Coastal Landscape Aesthetic Quality Score - out of **14.8%** (based on mean score given by panel of assessors to a video panorama of the beach area)

17. Beach User Climate

a) Temperature (from nomogram modified from Mieczkowski, 1985).

From nomogram:	Score
1,2 - very hot	0.35
3,4 - hot	1.17
5 - warm	1.33
4,3 - neither cold nor warm	0.57
2,1 - cool	0.29
0 - cold	0.02

b) Rainfall

Mean monthly precipitation (mm)	Score	Mean monthly precipitation (mm)	Score
<15	2.15	90 - 105	0.86
15 - 30	1.94	105 - 120	0.65
30 - 45	1.72	120 - 135	0.43
45 - 60	1.51	135 - 150	0.22
60 - 75	1.29	>150	0
75 - 90	1.08		

c) Sunshine

Mean monthly hours of sunshine per day	Score	Mean monthly hours of sunshine per day	Score
>10	1.72	4 - 5	0.69
9 - 10	1.55	3 - 4	0.52
8 - 9	1.38	2 - 3	0.34
7 - 8	1.20	1 - 2	0.17
6 - 7	1.03	<1	0
5 - 6	0.86		

d) Wind Speed

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	1.78	2.5 - 3.4	0.71
0.8 - 1.6	1.42	3.5 - 5.5	0.36
1.6 - 2.5	1.07	>5.5	0

BIOLOGICAL FACTORS

18. Floating material (leaves, twigs, debris, litter,)

Much usually present	Some often present	Rarely/never present
0	1.14	2.28

19. Smells of rotting fish, seaweed

Often bad	Sometimes present/not severe	Rarely/never present
0	0.59	1.19

20. Birdlife

Over abundant/pest proportions	Varied, plentiful birdlife	Some usually present	Absent
N/A	N/A	N/A	N/A

21. Other fauna (in rock pools, etc.)

Absent	Some, little variety	Abundant, varied fauna
0	0.97	1.95

22. Insects or similar pests

Many	Some often present	Absent
0	0.99	1.99

23. Dangerous animals offshore (jellyfish, sharks, weeverfish, etc.); average occurances per season

>5	1 - 5	<1
0	1.07	2.13

24. Seaweed (algae) washed up on beach

Usually abundant	Some present	Absent
0	0.47	0.94

25. Sewage debris on beach (average number of items along 10m of strandline from examination of 100m)

Abundant (>10 items)	Some present (1 - 10 items)	Absent
0	1.73	3.46

26. Water quality

<95% pass of 'T' (mandatory) stds. (DoE 'fail')	0
95% pass of 'T' stds. (DoE 'pass')	0.86
100% pass of 'T' stds.	1.71
100% pass of 'T' stds, 80% pass 'G' (guideline) coliform stds.	2.57
100% pass of 'T' stds, 80% pass 'G' coliform stds, 90% pass 'G' faecal streptococcus stds.	3.42

27. Flora (immediate vicinity of beach; within 100m)

Absent	Some, little variety	Varied, interesting plants with >50% of beach hinterland vegetated
0	0.99	1.97

HUMAN USE FACTORS

28. Odours from industry (fumes, smog)

Often bad	Sometimes present/not severe	Rarely/never present
0	1.66	3.32

29. Traffic fumes

Often bad	Sometimes present/not severe	Rarely/never present
0	1.56	3.11

30. Odours from catering, food preparation

Frequently strong	Sometimes detectable/not strong	Absent
0	0.90	1.8

31. Litter on beach (non-sewage)

Usually abundant	Considerable amount present	Very little present	Absent
0	1.12	2.24	3.36

32. Oil (on rocks, pebbles, in sand, etc.)

Many patches evident on rocks/sand	Traces (occasional spots) present	Absent
0	1.56	3.12

33. Access (to resort/nearest car park by vehicle)

Road mainly single track with passing places	1.07
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50m apart	0.98
Well signposted (to beach/resort/nearest car park) metalled road, continuously over 4m wide	0.37

34. Location of nearest car parking

No car park within 1 km	Car park more than 200 m from beach	Car park within 200 m
0.92	1.13	0.78

35. Access (to beach itself from resort/car park)

No clearly visible path to beach	0.59
Path rough or steep or with steps	0.96
Good level path to beach	0.94
Road or wide tarmac/concrete path leading to edge of beach	0.45

36. Toilets - number (of cubicles)

Absent	0
1 per gender	0.64
1 - 3 per gender	1.28
>3 per gender	1.93

37. Toilets - cleanliness

Extremely filthy/vandalised	0
Quite dirty	0.89
Slightly dirty	1.78
Very clean	2.67

38. Showers

Absent or extremely filthy/vandalised	One only, or several but dirty	>1, clean
0	0.41	0.82

39. Fresh water - washing & drinking (including those in toilet block)

None	Tap in wash-hand basin only	Taps (non-potable water)	Potable water
0	0.68	0.68	1.35

40. Refreshments/cafes

None	Basic refreshments	Wide selection of food & drink
0.70	0.78	0.27

41. Bars

Bars/cafes serving alcohol	0.51
No alcohol served	1.60

42. Chairs/sunbeds

Not available	0
Available	0.70

43. Lifeguards

Absent	0
Present in busy periods only	0.81
Present throughout EC bathing season	1.62

44. Motor vehicle noise (including from car park) and/or railway noise

Constant high level during day	Some noise	None
0	1.27	2.54

45. Noise from industry

Constant high level during day	Often some noise	None
0	1.55	3.10

46. Are vehicles permitted on beach?

Vehicles allowed to drive on the beach	0.25
No vehicles allowed on beach	2.64

47. Are animals permitted on the beach?

Dogs or donkeys allowed on beach	0.88
Dogs banned from beach	1.60

48. Are watersports (water-skiing, jet-skiing, sail boarding), permitted offshore?

Allowed anywhere	0.43
Allowed in one area only	1.74
Banned	1.05

oooooooooooooooooooooooooooooooooooooooo

Appendix 17

Scored Beach Checklist - Beaches with Basic Visitor Facilities

BEACH QUALITY RATING CHECKLIST (WALES)

Resort/Beach.....

Map Ref. ..... Date.....

Time of survey.....

Weather conditions:

				Sea conditions (breaking wave size):	
Sunny		Dry		Flat calm	
Broken cloud		Drizzle/showers		10 - 30cms	
Overcast		Rain		30 - 100cms	
				1 - 2m	
Hot (>20°C)		Calm		>2m	
Warm (15 - 20°C)		Breezy			
Cool (<15°C)		Windy			

PHYSICAL FACTORS

1. Beach width at mean low tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.27	0.97	0.82	0.63	0.40	0.19

2. Beach width at mean high tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.59	0.61	0.89	0.46	0.23	0.17

3. Predominant beach material (above high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.53	0.68	1.27	0.02

4. Predominant beach material (below high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.53	0.68	1.27	0.02

5. Water temperature (mean during EC bathing season)

<10 °C	10 - 15 °C	16 - 21 °C	22 - 26 °C	27 - 32 °C	>32 °C
0.06	0.36	0.93	1.39	0.84	0.34

6. Beach microclimate (shelter from wind, etc.)

Very exposed	Sheltered, some breeze	Tightly enclosed/over sheltered
0.11	1.54	0.91

7. Size of breaking waves

<10cm	10 - 30cm	30 cm - 1m	1 - 2m	>2m
0.59	0.80	0.82	0.48	0.25

8. Average beach slope above high water mark

<5°	5 - 20°	Very steep (>20°)
0.95	1.43	0.06

9. Distance from water edge to 50 cm water depth (mid-tide)

3m or less	3 - 7m	7 - 20m	>20m
0.36	1.43	1.39	0.65

10. Submerged obstacles, trenches, pits, sharp rocks

Many, large/deep	Few	Occasional	None
0	0.69	1.38	2.07

11. Sand/beach colour

Black	Grey	Brown	Light tan	White
0.02	0.08	0.72	1.73	1.58

12. Amount/thickness of sand

Patchy sand with protruding rocks	Smooth, flat rock	Good sand cover
N/A	N/A	N/A

13. Presence of dangerous cliffs, precipices, etc.

Dangerous, loose cliffs directly above beach	Cliffs, negligible stonefall danger	None directly above beach
0	1.34	2.68

14. Water clarity; can see bottom at max.depth (at mid-tide) of:

<1m	1 - 2m	2 - 3m	3 - 4m	>4m
0	0.61	1.21	1.82	2.43

15. Beach safety rating, based on:

(a) Beach type — Dissipative: wide surf zone, fine sand
Intermediate
Reflective: steep slope, medium to coarse sand, 0 - 1m breakers

(b) Wave size (to nearest 0.5m)

SUBTRACT up to: **8.36%** (calculated score based on beach morphology, tide and wave height. Devised by Coastal Studies Unit, University of Sydney)

16. Coastal Landscape Aesthetic Quality Score - out of **11.7%** (based on mean score given by panel of assessors to a video panorama of the beach area)

17. Beach User Climate

a) Temperature (from nomogram modified from Mieczkowski, 1985).

From nomogram:	Score
1,2 - very hot	0.42
3,4 - hot	1.37
5 - warm	1.77
4,3 - neither cold nor warm	0.70
2,1 - cool	0.23
0 - cold	0.02

b) Rainfall

Mean monthly precipitation (mm)	Score	Mean monthly precipitation (mm)	Score
<15	2.26	90 - 105	0.90
15 - 30	2.03	105 - 120	0.68
30 - 45	1.81	120 - 135	0.45
45 - 60	1.58	135 - 150	0.23
60 - 75	1.36	>150	0
75 - 90	1.13		

c) Sunshine

Mean monthly hours of sunshine per day	Score	Mean monthly hours of sunshine per day	Score
>10	2.13	4 - 5	0.85
9 - 10	1.92	3 - 4	0.64
8 - 9	1.70	2 - 3	0.43
7 - 8	1.49	1 - 2	0.21
6 - 7	1.28	<1	0
5 - 6	1.07		

d) Wind Speed

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	2.05	2.5 - 3.4	0.82
0.8 - 1.6	1.64	3.5 - 5.5	0.41
1.6 - 2.5	1.23	>5.5	0

BIOLOGICAL FACTORS

18. Floating material (leaves, twigs, debris, litter,)

Much usually present	Some often present	Rarely/never present
0	1.19	2.38

19. Smells of rotting fish, seaweed

Often bad	Sometimes present/not severe	Rarely/never present
0	0.71	1.41

20. Birdlife

Over abundant/pest proportions	Varied, plentiful birdlife	Some usually present	Absent
N/A	N/A	N/A	N/A

21. Other fauna (in rock pools, etc.)

Absent	Some, little variety	Abundant, varied fauna
0	0.96	1.92

22. Insects or similar pests

Many	Some often present	Absent
0	1.06	2.11

23. Dangerous animals offshore (jellyfish, sharks, weeverfish, etc.); average occurances per season

>5	1 - 5	<1
0	1.18	2.36

24. Seaweed (algae) washed up on beach

Usually abundant	Some present	Absent
0	0.68	1.35

25. Sewage debris on beach (average number of items along 10m of strandline from examination of 100m)

Abundant (>10 items)	Some present (1 - 10 items)	Absent
0	1.53	3.06

26. Water quality

<95% pass of 'T' (mandatory) stds. (DoE 'fail')	0
95% pass of 'T' stds. (DoE 'pass')	0.76
100% pass of 'T' stds.	1.55
100% pass of 'T' stds, 80% pass 'G' (guideline) coliform stds.	2.33
100% pass of 'T' stds, 80% pass 'G' coliform stds, 90% pass 'G' faecal streptococcus stds.	3.10

27. Flora (immediate vicinity of beach; within 100m)

Absent	Some, little variety	Varied, interesting plants with >50% of beach hinterland vegetated
0	0.83	1.67

HUMAN USE FACTORS

28. Odours from industry (fumes, smog)

Often bad	Sometimes present/not severe	Rarely/never present
0	1.49	2.98

29. Traffic fumes

Often bad	Sometimes present/not severe	Rarely/never present
0	1.34	2.68

30. Odours from catering, food preparation

Frequently strong	Sometimes detectable/not strong	Absent
0	0.82	1.65

31. Litter on beach (non-sewage)

Usually abundant	Considerable amount present	Very little present	Absent
0	0.99	1.98	2.98

32. Oil (on rocks, pebbles, in sand, etc.)

Many patches evident on rocks/sand	Traces (occasional spots) present	Absent
0	1.47	2.93

33. Access (to resort/nearest car park by vehicle)

Road mainly single track with passing places	0.42
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50m apart	1.03
Well signposted (to beach/resort/nearest car park) metalled road, continuously over 4m wide	0.70

34. Location of nearest car parking

No car park within 1 km	Car park more than 200 m from beach	Car park within 200 m
0.23	1.27	1.60

35. Access (to beach itself from resort/car park)

No clearly visible path to beach	0.25
Path rough or steep or with steps	0.91
Good level path to beach	1.60
Road or wide tarmac/concrete path leading to edge of beach	0.97

36. Toilets - number (of cubicles)

Absent	0
1 per gender	0.89
1 - 3 per gender	1.77
>3 per gender	2.66

37. Toilets - cleanliness

Extremely filthy/vandalised	0
Quite dirty	0.99
Slightly dirty	1.99
Very clean	3.00

38. Showers

Absent or extremely filthy/vandalised	One only, or several but dirty	>1, clean
0	0.46	0.93

39. Fresh water - washing & drinking (including those in toilet block)

None	Tap in wash-hand basin only	Taps (non-potable water)	Potable water
0	0.84	0.84	1.69

40. Refreshments/cafes

None	Basic refreshments	Wide selection of food & drink
0.34	1.27	0.68

41. Bars

Bars/cafes serving alcohol	0.42
No alcohol served	1.16

42. Chairs/sunbeds

Not available	0
Available	0.84

43. Lifeguards

Absent	0
Present in busy periods only	1.07
Present throughout EC bathing season	2.13

44. Motor vehicle noise (including from car park) and/or railway noise

Constant high level during day	Some noise	None
0	1.07	2.13

45. Noise from industry

Constant high level during day	Often some noise	None
0	1.37	2.74

46. Are vehicles permitted on beach?

Vehicles allowed to drive on the beach	0.15
No vehicles allowed on beach	2.24

47. Are animals permitted on the beach?

Dogs or donkeys allowed on beach	0.57
Dogs banned from beach	1.58

48. Are watersports (water-skiing, jet-skiing, sail boarding), permitted offshore?

Allowed anywhere	0.38
Allowed in one area only	1.60
Banned	0.82

oooooooooooooooooooooooooooooooooooooooo

Appendix 18

Scored Beach Checklist - Beaches at Small Resorts

BEACH QUALITY RATING CHECKLIST (WALES)

Resort/Beach.....

Map Ref. ..... Date.....

Time of survey.....

Weather conditions:

				Sea conditions (breaking wave size):	
Sunny		Dry		Flat calm	
Broken cloud		Drizzle/showers		10 - 30cms	
Overcast		Rain		30 - 100cms	
				1 - 2m	
Hot (>20°C)		Calm		>2m	
Warm (15 - 20°C)		Breezy			
Cool (<15°C)		Windy			

PHYSICAL FACTORS

1. Beach width at mean low tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.28	0.63	0.81	0.63	0.33	0.22

2. Beach width at mean high tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.48	0.81	0.89	0.59	0.22	0.17

3. Predominant beach material (above high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.50	0.72	1.33	0.02

4. Predominant beach material (below high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.50	0.72	1.33	0.02

5. Water temperature (mean during EC bathing season)

<10°C	10 - 15 °C	16 - 21 °C	22 - 26 °C	27 - 32°C	>32 °C
0.02	0.35	0.74	1.44	1.29	0.55

6. Beach microclimate (shelter from wind, etc.)

Very exposed	Sheltered, some breeze	Tightly enclosed/over sheltered
0.09	1.55	0.96

7. Size of breaking waves

<10cm	10 - 30cm	30 cm - 1m	1 - 2m	>2m
0.57	0.81	0.76	0.44	0.22

8. Average beach slope above high water mark

<5°	5 - 20°	Very steep (>20°)
1.11	1.48	0.02

9. Distance from water edge to 50 cm water depth (mid-tide)

3m or less	3 - 7m	7 - 20m	>20m
0.33	1.29	1.50	0.68

10. Submerged obstacles, trenches, pits, sharp rocks

Many, large/deep	Few	Occasional	None
0	0.73	1.47	2.20

11. Sand/beach colour

Black	Grey	Brown	Light tan	White
0.02	0.02	0.74	1.92	1.77

12. Amount/thickness of sand

Patchy sand with protruding rocks	Smooth, flat rock	Good sand cover
N/A	N/A	N/A

13. Presence of dangerous cliffs, precipices, etc.

Dangerous, loose cliffs directly above beach	Cliffs, negligible stonefall danger	None directly above beach
0	1.40	2.79

14. Water clarity; can see bottom at max.depth (at mid-tide) of:

<1m	1 - 2m	2 - 3m	3 - 4m	>4m
0	0.60	1.20	1.80	2.40

15. Beach safety rating, based on:

(a) Beach type — Dissipative: wide surf zone, fine sand
Intermediate
Reflective: steep slope, medium to coarse sand, 0 - 1m breakers

(b) Wave size (to nearest 0.5m)

SUBTRACT up to: **8.52%** (calculated score based on beach morphology, tide and wave height. Devised by Coastal Studies Unit, University of Sydney)

16. Coastal Landscape Aesthetic Quality Score - out of **8.83%** (based on mean score given by panel of assessors to a video panorama of the beach area)

17. Beach User Climate

a) Temperature (from nomogram modified from Mieczkowski, 1985).

From nomogram:	Score
1,2 - very hot	0.44
3,4 - hot	1.53
5 - warm	1.66
4,3 - neither cold nor warm	0.65
2,1 - cool	0.26
0 - cold	0.04

b) Rainfall

Mean monthly precipitation (mm)	Score	Mean monthly precipitation (mm)	Score
<15	2.51	90 - 105	1.00
15 - 30	2.26	105 - 120	0.75
30 - 45	2.01	120 - 135	0.50
45 - 60	1.76	135 - 150	0.25
60 - 75	1.51	>150	0
75 - 90	1.26		

c) Sunshine

Mean monthly hours of sunshine per day	Score	Mean monthly hours of sunshine per day	Score
>10	2.33	4 - 5	0.93
9 - 10	2.10	3 - 4	0.70
8 - 9	1.86	2 - 3	0.47
7 - 8	1.63	1 - 2	0.23
6 - 7	1.40	<1	0
5 - 6	1.17		

d) Wind Speed

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	2.27	2.5 - 3.4	0.91
0.8 - 1.6	1.82	3.5 - 5.5	0.45
1.6 - 2.5	1.36	>5.5	0

BIOLOGICAL FACTORS

18. Floating material (leaves, twigs, debris, litter,)

Much usually present	Some often present	Rarely/never present
0	1.21	2.42

19. Smells of rotting fish, seaweed

Often bad	Sometimes present/not severe	Rarely/never present
0	0.82	1.64

20. Birdlife

Over abundant/pest proportions	Varied, plentiful birdlife	Some usually present	Absent
N/A	N/A	N/A	N/A

21. Other fauna (in rock pools, etc.)

Absent	Some, little variety	Abundant, varied fauna
0	1.01	2.03

22. Insects or similar pests

Many	Some often present	Absent
0	1.11	2.22

23. Dangerous animals offshore (jellyfish, sharks, weeverfish, etc.); average occurances per season

>5	1 - 5	<1
0	1.15	2.29

24. Seaweed (algae) washed up on beach

Usually abundant	Some present	Absent
0	0.77	1.55

25. Sewage debris on beach (average number of items along 10m of strandline from examination of 100m)

Abundant (>10 items)	Some present (1 - 10 items)	Absent
0	1.49	2.99

26. Water quality

<95% pass of 'T' (mandatory) stds. (DoE 'fail')	0
95% pass of 'T' stds. (DoE 'pass')	0.75
100% pass of 'T' stds.	1.49
100% pass of 'T' stds, 80% pass 'G' (guideline) coliform stds.	2.24
100% pass of 'T' stds, 80% pass 'G' coliform stds, 90% pass 'G' faecal streptococcus stds.	2.99

27. Flora (immediate vicinity of beach; within 100m)

Absent	Some, little variety	Varied, interesting plants with >50% of beach hinterland vegetated
0	0.78	1.57

HUMAN USE FACTORS

28. Odours from industry (fumes, smog)

Often bad	Sometimes present/not severe	Rarely/never present
0	1.45	2.90

29. Traffic fumes

Often bad	Sometimes present/not severe	Rarely/never present
0	1.28	2.55

30. Odours from catering, food preparation

Frequently strong	Sometimes detectable/not strong	Absent
0	0.93	1.85

31. Litter on beach (non-sewage)

Usually abundant	Considerable amount present	Very little present	Absent
0	0.97	1.94	2.90

32. Oil (on rocks. pebbles. in sand. etc.)

Many patches evident on rocks/sand	Traces (occasional spots) present	Absent
0	1.49	2.99

33. Access (to resort/nearest car park by vehicle)

Road mainly single track with passing places	0.26
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50m apart	1.07
Well signposted (to beach/resort/nearest car park) metalled road, continuously over 4m wide	1.00

34. Location of nearest car parking

No car park within 1 km	Car park more than 200 m from beach	Car park within 200 m
0.13	1.13	1.79

35. Access (to beach itself from resort/car park)

No clearly visible path to beach	0.20
Path rough or steep or with steps	0.76
Good level path to beach	1.59
Road or wide tarmac/concrete path leading to edge of beach	1.13

36. Toilets - number (of cubicles)

Absent	0
1 per gender	0.96
1 - 3 per gender	1.90
>3 per gender	2.86

37. Toilets - cleanliness

Extremely filthy/vandalised	0
Quite dirty	0.95
Slightly dirty	1.90
Very clean	2.86

38. Showers

Absent or extremely filthy/vandalised	One only, or several but dirty	>1, clean
0	0.58	1.16

39. Fresh water - washing & drinking (including those in toilet block)

None	Tap in wash-hand basin only	Taps (non-potable water)	Potable water
0	0.68	1.37	2.05

40. Refreshments/cafes

None	Basic refreshments	Wide selection of food & drink
0.24	1.40	1.42

41. Bars

Bars/cafes serving alcohol	0.72
No alcohol served	1.22

42. Chairs/sunbeds

Not available	0
Available	1.16

43. Lifeguards

Absent	0
Present in busy periods only	1.11
Present throughout EC bathing season	2.22

44. Motor vehicle noise (including from car park) and/or railway noise

Constant high level during day	Some noise	None
0	1.07	2.14

45. Noise from industry

Constant high level during day	Often some noise	None
0	1.32	2.64

46. Are vehicles permitted on beach?

Vehicles allowed to drive on the beach	0.20
No vehicles allowed on beach	2.35

47. Are animals permitted on the beach?

Dogs or donkeys allowed on beach	0.44
Dogs banned from beach	1.46

48. Are watersports (water-skiing, jet-skiing, sail boarding), permitted offshore?

Allowed anywhere	0.39
Allowed in one area only	1.40
Banned	0.57

oooooooooooooooooooooooooooooooooooooooo

Appendix 19

Scored Beach Checklist - Beaches at Medium/Large Resorts

BEACH QUALITY RATING CHECKLIST (WALES)

Resort/Beach.....

Map Ref. ..... Date.....

Time of survey.....

Weather conditions:

Sea conditions (breaking wave size):

Sunny	☐	Dry	☐	Flat calm	☐
Broken cloud	☐	Drizzle/showers	☐	10 - 30cms	☐
Overcast	☐	Rain	☐	30 - 100cms	☐
				1 - 2m	☐
Hot (>20°C)	☐	Calm	☐	>2m	☐
Warm (15 - 20°C)	☐	Breezy	☐		
Cool (<15°C)	☐	Windy	☐		

PHYSICAL FACTORS

1. Beach width at mean low tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.42	0.51	0.55	0.62	0.59	0.48

2. Beach width at mean high tide

<20m	20 - 50m	50 - 200m	200 - 400m	400 - 800m	>800m
0.53	0.73	0.57	0.62	0.29	0.18

3. Predominant beach material (above high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.44	0.66	1.32	0.09

4. Predominant beach material (below high water mark) - percentage of each

Cobbles (>5 cm)/rock	Gravel (1 to 50 mm)	Sand (0.1 to 1 mm)	Mud
0.44	0.66	1.32	0.09

5. Water temperature (mean during EC bathing season)

<10 °C	10 - 15 °C	16 - 21 °C	22 - 26 °C	27 - 32 °C	>32 °C
0.04	0.42	0.62	1.23	1.14	0.68

6. Beach microclimate (shelter from wind, etc.)

Very exposed	Sheltered, some breeze	Tightly enclosed/over sheltered
0.26	1.50	0.95

7. Size of breaking waves

<10cm	10 - 30cm	30 cm - 1m	1 - 2m	>2m
0.73	0.95	0.66	0.48	0.44

8. Average beach slope above high water mark

<5°	5 - 20°	Very steep (>20°)
1.14	1.43	0.07

9. Distance from water edge to 50 cm water depth (mid-tide)

3m or less	3 - 7m	7 - 20m	>20m
0.35	1.32	1.39	0.7

10. Submerged obstacles, trenches, pits, sharp rocks

Many, large/deep	Few	Occasional	None
0	0.7	1.39	2.09

11. Sand/beach colour

Black	Grey	Brown	Light tan	White
0	0.09	0.66	1.87	1.50

12. Amount/thickness of sand

Patchy sand with protruding rocks	Smooth, flat rock	Good sand cover
N/A	N/A	N/A

13. Presence of dangerous cliffs, precipices, etc.

Dangerous, loose cliffs directly above beach	Cliffs, negligible stonefall danger	None directly above beach
0	1.30	2.60

14. Water clarity; can see bottom at max.depth (at mid-tide) of:

<1m	1 - 2m	2 - 3m	3 - 4m	>4m
0	0.63	1.25	1.88	2.51

15. Beach safety rating, based on:

(a) Beach type — Dissipative: wide surf zone, fine sand
Intermediate
Reflective: steep slope, medium to coarse sand, 0 - 1m breakers

(b) Wave size (to nearest 0.5m)

SUBTRACT up to: **7.48%** (calculated score based on beach morphology, tide and wave height. Devised by Coastal Studies Unit, University of Sydney)

16. Coastal Landscape Aesthetic Quality Score - out of **8.87%** (based on mean score given by panel of assessors to a video panorama of the beach area)

17. Beach User Climate

a) Temperature (from nomogram modified from Mieczkowski, 1985).

From nomogram:	Score
1,2 - very hot	0.77
3,4 - hot	1.58
5 - warm	1.50
4,3 - neither cold nor warm	0.42
2,1 - cool	0.33
0 - cold	0.02

b) Rainfall

Mean monthly precipitation (mm)	Score	Mean monthly precipitation (mm)	Score
<15	2.66	90 - 105	1.06
15 - 30	2.39	105 - 120	0.80
30 - 45	2.13	120 - 135	0.53
45 - 60	1.86	135 - 150	0.27
60 - 75	1.60	>150	0
75 - 90	1.33		

c) Sunshine

Mean monthly hours of sunshine per day	Score	Mean monthly hours of sunshine per day	Score
>10	2.42	4 - 5	0.97
9 - 10	2.18	3 - 4	0.73
8 - 9	1.94	2 - 3	0.48
7 - 8	1.67	1 - 2	0.24
6 - 7	1.45	<1	0
5 - 6	1.21		

d) Wind Speed

Mean wind speed (ms^{-1})	Score	Mean wind speed (ms^{-1})	Score
<0.8	2.22	2.5 - 3.4	0.89
0.8 - 1.6	1.78	3.5 - 5.5	0.44
1.6 - 2.5	1.33	>5.5	0

BIOLOGICAL FACTORS

18. Floating material (leaves, twigs, debris, litter,)

Much usually present	Some often present	Rarely/never present
0	1.05	2.09

19. Smells of rotting fish, seaweed

Often bad	Sometimes present/not severe	Rarely/never present
0	0.90	1.80

20. Birdlife

Over abundant/pest proportions	Varied, plentiful birdlife	Some usually present	Absent
N/A	N/A	N/A	N/A

21. Other fauna (in rock pools, etc.)

Absent	Some, little variety	Abundant, varied fauna
0	0.75	1.50

22. Insects or similar pests

Many	Some often present	Absent
0	1.03	2.07

23. Dangerous animals offshore (jellyfish, sharks, weeverfish, etc.): average occurances per season

>5	1 - 5	<1
0	1.20	2.40

24. Seaweed (algae) washed up on beach

Usually abundant	Some present	Absent
0	0.89	1.78

25. Sewage debris on beach (average number of items along 10m of strandline from examination of 100m)

Abundant (>10 items)	Some present (1 - 10 items)	Absent
0	1.49	2.97

26. Water quality

<95% pass of 'I' (mandatory) stds. (DoE 'fail')	0
95% pass of 'I' stds. (DoE 'pass')	0.75
100% pass of 'I' stds.	1.50
100% pass of 'I' stds, 80% pass 'G' (guideline) coliform stds.	2.24
100% pass of 'I' stds, 80% pass 'G' coliform stds, 90% pass 'G' faecal streptococcus stds.	2.99

27. Flora (immediate vicinity of beach; within 100m)

Absent	Some, little variety	Varied, interesting plants with >50% of beach hinterland vegetated
0	0.89	1.78

HUMAN USE FACTORS

28. Odours from industry (fumes, smog)

Often bad	Sometimes present/not severe	Rarely/never present
0	1.34	2.68

29. Traffic fumes

Often bad	Sometimes present/not severe	Rarely/never present
0	1.17	2.33

30. Odours from catering, food preparation

Frequently strong	Sometimes detectable/not strong	Absent
0	0.75	1.50

31. Litter on beach (non-sewage)

Usually abundant	Considerable amount present	Very little present	Absent
0	1.00	2.01	3.01

32. Oil (on rocks, pebbles, in sand, etc.)

Many patches evident on rocks/sand	Traces (occasional spots) present	Absent
0	1.38	2.75

33. Access (to resort/nearest car park by vehicle)

Road mainly single track with passing places	0.40
Signposted from a classified road, with road surfaced and either wide enough for 2 cars or with passing places <50m apart	0.99
Well signposted (to beach/resort/nearest car park) metalled road, continuously over 4m wide	1.17

34. Location of nearest car parking

No car park within 1 km	Car park more than 200 m from beach	Car park within 200 m
0.13	1.10	1.89

35. Access (to beach itself from resort/car park)

No clearly visible path to beach	0.15
Path rough or steep or with steps	0.77
Good level path to beach	1.83
Road or wide tarmac/concrete path leading to edge of beach	1.47

36. Toilets - number (of cubicles)

Absent	0
1 per gender	0.89
1 - 3 per gender	1.77
>3 per gender	2.66

37. Toilets - cleanliness

Extremely filthy/vandalised	0
Quite dirty	0.93
Slightly dirty	1.86
Very clean	2.79

38. Showers

Absent or extremely filthy/vandalised	One only, or several but dirty	>1, clean
0	0.78	1.56

39. Fresh water - washing & drinking (including those in toilet block)

None	Tap in wash-hand basin only	Taps (non-potable water)	Potable water
0	1.23	1.23	2.46

40. Refreshments/cafes

None	Basic refreshments	Wide selection of food & drink
0.09	1.43	1.83

41. Bars

Bars/cafes serving alcohol	1.34
No alcohol served	0.57

42. Chairs/sunbeds

Not available	0
Available	1.43

43. Lifeguards

Absent	0
Present in busy periods only	1.20
Present throughout EC bathing season	2.40

44. Motor vehicle noise (including from car park) and/or railway noise

Constant high level during day	Some noise	None
0	0.99	1.98

45. Noise from industry

Constant high level during day	Often some noise	None
0	1.25	2.51

46. Are vehicles permitted on beach?

Vehicles allowed to drive on the beach	0.48
No vehicles allowed on beach	2.35

47. Are animals permitted on the beach?

Dogs or donkeys allowed on beach	0.42
Dogs banned from beach	1.58

48. Are watersports (water-skiing, jet-skiing, sail boarding), permitted offshore?

Allowed anywhere	0.70
Allowed in one area only	1.23
Banned	0.37

oooooooooooooooooooooooooooooooooooooooo

Appendix 20

Example of Data Processing Stages (for one beach parameter)

For this example, the parameter for which data processing will be demonstrated is road access to the beach. Beach users selected both preference (in Part 2 of the questionnaire) and priority (in Part 3 of the questionnaire). The relevant questions and example responses were:

Part 2

I'd like the beach:

to have a wide, signposted road to it [2] **to have signs, but not a wide road** [1] **to be down a narrow road** [3]

Part 3

Whether there is a wide road or a narrow lane to the nearest car park is extremely important to me	1 (2) 3 4 5	**I don't mind whether there is a wide road or a narrow lane to the nearest car park**

For the "Part 2" question in the questionnaire, the SPSS codes given were:

Preference	SPSS Code	Response for this example
wide, signposted road	road1	road1 = 2
signs, but not a wide road	road2	road2 = 1
down a narrow road	road3	road3 = 3

For the "Part 3" question, the SPSS code used was "PRROAD"; hence:

PRROAD = 2

Recoding, etc, followed the procedure shown in Chapter 5.7.3., so that the responses to the "Part 2" question, which had 3 options available, were recoded as:

Original Response		Recoded Value
road1 = 2	recoded as:	rload1 = 0.5
road2 = 1	recoded as:	rload2 = 1.0
road3 = 3	recoded as:	rload3 = 0.0

Returning to the response to the "Part 3" question, recoding followed the pattern for questions with highest priority at the "1" end of the 1 to 5 scale (Chapter 5.7.3):

Original Response		Recoded Value
PRROAD = 2	recoded as:	P1RROAD = 3

For this questionnaire, the mean priority level ("MEANPR"; see Chapter 5.7.3), was 2.362. So a new variable (P2RROAD) to indicate priority for road access was generated by the following expression:

P2RROAD = P1RROAD/MEANPR

= 3/2.362

= 1.270

Finally, a combined preference/priority score was calculated by multiplying each corrected preference score (r1oad1 = 0.5, r1oad2 = 1.0, r1oad3 = 0.0), by the final corrected priority score of 1.27:

Corrected Preference Score	Calculation	Combined Preference/Priority Score
r1oad1 = 0.5	0.5 x 1.270 = 0.635	CROAD1 = 0.635
r1oad2 = 1.0	1.0 x 1.270 = 1.270	CROAD2 = 1.270
r1oad3 = 0.0	0.0 x 1.270 = 0.000	CROAD3 = 0.000

For statistical purposes, a mean value was calculated for each of these combined preference/priority scores for beach users preferring to visit each beach type.